Canada - European Union
Trade and Investment Relations

The Impact of Tariff Elimination

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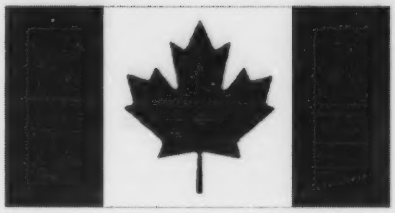

Canada - European Union Trade and Investment Relations

The Impact of Tariff Elimination

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ABSTRACT

SERIOUS CONSIDERATION OF A FREE TRADE AGREEMENT between Canada and the European Union (EU) may not be such a big step for either party. After all, Canada and the EU member nations are already functioning largely in a free trade environment and facing up to the competition existing in open markets – the former with the United States and Mexico amongst others, and the latter primarily with themselves. In this paper, we explore and measure some of the economic implications for a possible Canada-European Union Free Trade Agreement from a Canadian perspective, focussing on the impact of the elimination of tariffs. We find that Canada-EU trade has been underperforming over the 1990s, exhibiting a significant downward trend in the context of overall Canadian trade. The results of this study also find, quite clearly, that the elimination of tariffs between Canada and the EU would have positive impacts on both participants.

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CANADA-EUROPEAN UNION
TRADE AND INVESTMENT RELATIONS
THE IMPACT OF TARIFF ELIMINATION

EXECUTIVE SUMMARY

Eliminating tariffs on Canada-EU trade would benefit consumers and business on both sides of the Atlantic through increased product choice, lower prices and lower costs for industrial inputs, according to this economic study of a potential free trade arrangement between Canada and the European Union (EU). This study provides a basis for public discussion about liberalizing trade on a bilateral basis between Canada and its second most important trade partner, the European Union.

The study concludes that Canadian exports to the EU would likely increase at least 11.2%, or $2.4 billion annually, if tariffs were eliminated on all merchandise trade except agricultural and processed food products. If tariffs were also eliminated in these sectors, Canada's exports would increase15.6% per cent, or $3.4 billion. Likewise, EU exports to Canada would rise by over $7 billion dollars a year, an increase greater than 34%, with or without including agri-food products.

In addition to being Canada's second largest trading partner, the EU is also Canada's second most important source and destination for foreign direct investment, again after the US. Canada exported $16 billion worth of goods to the EU in 1999, and imported $31.4 billion. Two-way services trade adds roughly another third to this $47.4 billion total. Canada's stock of foreign direct investment in the EU stood at nearly $49 billion in 1999, while the EU's cumulative direct investment in Canada was $45 billion.

There is clearly scope for expansion of bilateral trade ties. Canada is one of only eight WTO members without preferential access to the EU market. Canada-EU trade accounts for only 8.7 per cent of Canada's total goods and services trade, and our trade with the EU is not growing as fast as with other regions around the globe. As a result, the EU's share of Canada's total exports and imports has been declining over the past decade.

The benefits of a potential FTA are substantial. The study finds that both Canada and the EU would experience significant gains as a result of reduced tariffs. Canada's net economic gain would amount to at least $US 200 million, while that for the EU would be approximately three times larger. As a percentage of GDP, Canada's gains would be roughly four times larger than European gains.

The analysis suggests that imports from Europe will rise in the high-tech, high-value added sectors, especially transportation equipment and machinery and equipment. Imports of products from the mining, iron and steel, and textiles sectors would also likely increase. The increase in imports from the EU will displace to some extent imports from other regions. Canadian exports in the machinery and equipment, and transportation sectors would increase strongly as well. Agricultural and processed food exports would also benefit significantly if these markets were liberalized.

Canada's bilateral merchandise trade deficit with the EU has grown over the 1990s, and this study suggests that gap would grow moderately with or without tariff elimination. The study observes that the central provinces of Ontario and Quebec, and to a lesser extent, British Columbia and Nova Scotia, are the provinces that trade the most with the EU. Thus, the benefits of tariff elimination between Canada and the EU would accrue the most to these provinces. The other provinces have limited exposure to trade with the EU, and would likely experience little impact.

Eliminating tariffs on Canada-EU trade would not only affect the bilateral trade relationship, but also would have impacts on our trade with other partners. The study finds that Canada will export between $0.1 and $1.0 billion less to other markets in order to meet increased demand in Europe for imports from Canada. Overall Canadian exports to the world would increase between $2.3 and $2.5 billion. Likewise, the EU would export somewhat less to other markets, diverting these exports to Canada. EU exports to the world in total are found to increase from $3.5 to $4.1 billion.

The study focusses on tariff elimination. It does not examine other important factors, such as non-tariff barriers, investment and services trade liberalization, and rules of origin. Certain sectors, especially those agriculture sectors with quantitative restrictions and prohibitive tariffs, are not adequately handled by the approach taken by the study because of a lack of "history" of foreign trade in their sectors. These special cases need additional, separate research and might or might not alter the findings of the study.

I. INTRODUCTION

INTERNATIONAL TRADE IS THE FRAMEWORK on which Canadian prosperity has rested upon in particular over the 1990s. Trade liberalization has been at the centre of Canada's trade strategy since the end of the second world war. Indeed, the Canadian economy has benefited from freer trade over the post war period. International trade agreements have lowered barriers to entry, reduced uncertainty, and have made it easier for Canadian firms to exploit trade opportunities. Freer trade has allowed firms to specialize in areas where the country has a comparative advantage and has given consumers access to a wider variety of lower-priced goods.

Our trade liberalizing strategy over the past fifty or so years has been aimed at making Canada a good trading partner and a better place to do business. More importantly, it has ensured that competitive Canadian companies have been able to take advantage of opportunities around the globe. From a broadly-based ideal aimed at multilateral liberalization at the GATT and now the WTO level, Canada's trade strategy has evolved to encompass as well bilateral trade and investment liberalization opportunities. The first of these measures, besides sectoral arrangements in the 1950s and 1960s involving defence production and automobiles, was the Canada-United States Free Trade Agreement (FTA), which brought about a stronger, more open trade and economic relationship with our most important trading partner and the largest economy in the world. The North American Free Trade Agreement (NAFTA) extended the benefits of the Canada-US FTA to include Mexico[1]. Canada's goal in each of these agreements has been a simple one: gain as much access to the markets as possible for competitive Canadian producers, workers, and investors, and secure that access with balanced, mutually advantageous rules. In return, Canada has opened its own market to the same extent, to the benefit of Canadian firms and consumers — who gain access to capital, goods, and services in greater variety and at world prices.

The positive effects of open markets are clearly evident in the strong growth of the Canadian economy over the past half-decade in particular — indeed, the growth of Canada's real GDP since 1989 is second only to the US among all the major industrialized countries. Our exports have benefited substantially from the economic expansion of our American free trade partner. Between 1989 and 1998, our total trade with the US (exports plus imports) rose a spectacular 140 per cent — from $235 billion to $564 billion. Or put another way, Canada-US trade now exceeds a million dollars a minute[2].

However, as impressive as the benefits of free trade with our American neighbours are, there is also an increased hazard associated with having all of our benefits from trade tied up in one source. In this sense, we are vulnerable from "overexposure" to US markets and could benefit by strengthening our ties with other economies in order to reduce our reliance on the US. In this way, trading resources can be shifted to take advantage of differences in the

business cycles of nations. This is not to say that trade with the US should be diminished. On the contrary, increased trade with the US is a good thing; however, if trade can be increased with other non-US regions, then so much the better for Canada. To this end, the Canadian Government has pursued bilateral free trade initiatives with individual trading partners in Latin and Central America, and has engaged in negotiations to establish a Free Trade Agreement of the Americas (FTAA). However, the most obvious candidate for another major free trade agreement is the European Union (EU) — Canada's second largest trading partner after the US.

The European Union is the core of an integrating Europe that is growing in economic power. More and more candidates for membership are knocking on the door. The EU already accounts for more trade and investment than any other area of the world, and the expected expansions into Eastern and South/Central Europe will create a market of some 550 million.

Economic relations between Canada and the EU are characterised by strong two-way trade and investment flows[3]. Trade between Canada and Europe has a long history[4]. Two-way trade in goods and services between Canada and the EU reached nearly $65 billion in 1999. The EU is also the second-most important source and destination for Canadian foreign direct investment after the United States. Just slightly less than 20 per cent of the stock of Canadian direct investment abroad has been placed in the EU and, equally, just slightly less than 20 per cent of the stock of foreign direct investment in Canada comes from the European Union. The completion of the single European market and the introduction of the euro offers vast new opportunities for Canadian business.

Canada established diplomatic relations with the precursor to the modern EU in 1958. In 1976, the European Economic Community (EEC) and Canada entered into a Framework Agreement for Commercial and Economic Cooperation[5]. This agreement was the EC's first framework cooperation agreement with an industrialised country, and has facilitated efforts by both sides to build economic ties and set the foundations to manage and resolve trade and investment disputes.

Under the umbrella of the 1996 Canada-EU Joint Action Plan, a number of bilateral agreements in the trade and economic area have been agreed upon. For example, the 1997 Agreement on Customs Cooperation and Mutual Assistance provides the basis for a closer working relationship between Canadian and EU customs administrators to combat fraud and to protect and promote legitimate trade. The 1998 Agreement on Mutual Recognition of Conformity Assessment facilitates bilateral trade by allowing each side to certify the conformity of products with the standards required by the other. The EU-Canada Trade Initiative (ECTI) was launched at the Canada-EU Summit in Ottawa in December 1998. ECTI sets a limited number of objectives aimed at improving market access and bilateral economic cooperation over a range of issues, and it also calls for regular consultations between both parties on multilateral trade issues.

Canada is, however, one of only eight WTO members without preferential access to the EU market. Canada has advocated the establishment of a Canada-EU free trade agreement (FTA) on a number of occasions, most notably with the November 1998 Senate Standing

Committee on Foreign Affairs report which called for an exploration of the costs and benefits of transatlantic free trade.

Bilateral consultations have already shown that the EU and Canadian positions are aligned on a vast majority of issues on the multilateral trade agenda. Considerable road-work on achieving agreement over various remaining trade issues has already been logged. There is cooperation from both sides and both sides recognize the growing complexity of trade and investment issues. Serious consideration of a free trade agreement between the EU and Canada may not be such a big step for either party – after all, Canada (with the US amongst others) and the EU member nations (primarily with themselves) are already functioning largely in a free trade environment and are facing up to the competition existing in open markets.

The purpose of this paper is to explore and measure some of the economic implications for Canada of tariff elimination from a possible Canada-European Union Free Trade Agreement. It is an important, albeit preliminary, element in the evaluation recommended by the Senate committee. The paper is not intended to be comprehensive or definitive; rather, it is intended to provide an indication of the broadly-based impacts of tariff liberalization between our two regions. Other important factors, such as non-tariff barriers, investment and services trade liberalization, and rules of origin considerations, may influence the results but are outside the scope of this study and are not examined here. Moreover, certain sectors, especially those agriculture sub-sectors with prohibitive tariffs are not adequately dealt with by our approach because of a lack of "history" of foreign trade in their sectors. Such sub-sectors need additional, separate study. With these caveats in mind, the outline of the remainder of this paper is as follows:

- review of the recent patterns of trade and investment in the Canadian and European economies;
- review of the econometric model and regression analysis;
- review of the CGE model work; and,
- conclusions.

II. Patterns of Trade and Investment Between Canada and the European Union

Trade

Why Liberalize Trade?

Trade liberalization among countries allows for more efficient use of domestic productive resources as each country increases production of those tradeable goods and services in which it has a comparative advantage. The reduction or elimination of trade barriers encourages countries to produce and export goods and services that are relatively less costly to produce at home, and to import those that are relatively expensive to produce domestically.

Eliminating trade barriers also favours consumers by lowering prices of both imported goods and domestically-produced consumer goods that compete with them. Further reductions in consumer prices are also possible due to lower costs for intermediate goods. Consumers also benefit from more direct competition between domestically produced goods and imports; as well, they face a wider choice of variety of goods and services available for purchase and consumption.

Greater exposure to competition and international opportunities also encourages price flexibility and faster response to market changes among firms. A more competitive environment also encourages innovation in business operations and stimulates investment in research and development of new processes and technologies: these, in turn, can be expected to raise the expected returns and profitability of competitive firms over the longer term.

Finally, barriers to trade make access to foreign markets uncertain. By clarifying trade rules, free trade agreements increase transparency, reduce uncertainty, and make it easier for firms to exploit trade opportunities.

Recent Changes in Canada-European Trade Patterns

Overview

The contemporary European Union is the result of a process of cooperation and integration which was initiated in 1951 by six countries, leading to the Treaty of Rome in 1957: *Belgium, France, Germany, Italy, Luxembourg,* and *the Netherlands*. Four waves of accessions (1973: Denmark, *Ireland,* and *the United Kingdom*; 1981: *Greece*; 1986: *Spain* and *Portugal*; and, 1995: Austria, *Finland,* and *Sweden*) have resulted in the present-day European Union with its fifteen Member States. A fifth enlargement is being prepared, this time towards Eastern and South/Central Europe[6].

The EU is what economists call a common market. In other words, it is an area, or bloc of member states, which has eliminated tariffs and other barriers to trade among its members, which permits the free movement of goods, services, people, and capital internally, and which applies a common external tariff on all imports from non-members.

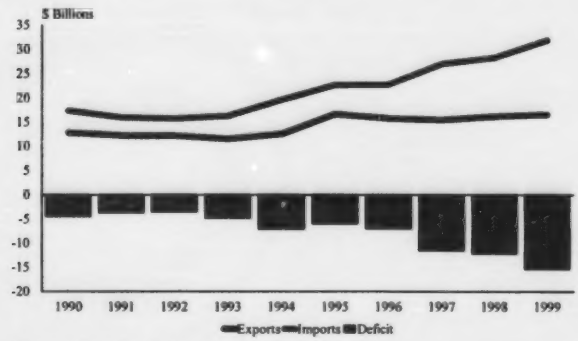
Of course, the contemporary European Union has evolved from a common market. The central purpose of today's EU is to organise relations between the Member States and between their peoples in a coherent manner and on the basis of solidarity. The main objectives of the Union are: to promote economic and social progress (the single market was established in 1993 and a single currency was launched in 1999); to assert the identity of the European Union on the international scene (through common foreign and security policy, common positions within international organisations, etc.); to introduce European citizenship (to complement national citizenship, by conferring a number of civil and political rights on European citizens); to develop an area of freedom, security, and justice (linked to the operation of the internal market and, more particularly, to the freedom of movement of persons); and, to maintain and build on established EU law (the founding treaties and all legislation adopted by the European institutions)[7].

The European Union is Canada's second largest trading partner after the United States. Total two-way trade in goods and services was $65.0 billion in 1999, up from $39.2 billion in 1990. This represents an expansion in two-way trade of roughly two-thirds over this period, or about a 5.8 per cent annual rate of increase.

Trade in goods between the two regions was fairly steady over the early 1990s; however, starting around 1994, imports from the EU began to rise appreciably. By 1999, import levels from the EU were almost double their levels recorded in 1993. On the other hand, Canadian exports of goods to the EU appear to have only experienced a "step up" from $12 billion to the $16 billion level between 1990-1994 and 1995-1999 (Chart 1).

CHART 1

CANADA-EUROPEAN UNION TRADE, 1990 TO 1999



Source: Statistics Canada

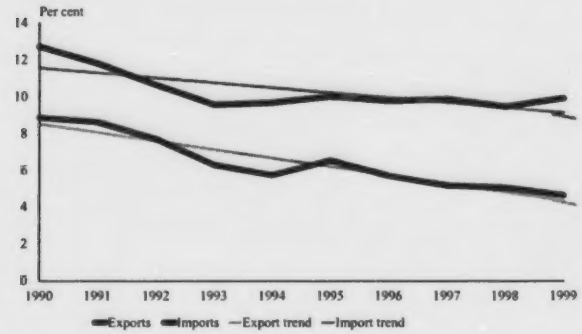
The combination of steadily rising imports from the EU and slower growth in Canadian exports to Europe has exacerbated Canada's merchandise trade deficit with Europe over the past decade. Canada's merchandise trade deficit widened some $11 billion over the 1990s, from $4.3 billion to $15.4 billion.

Hand-in-hand with the weak showing of Canadian exports to the European region is the poor overall performance of Canada-Europe trade within the context of overall Canadian merchandise trade. Chart 2 examines Canada's exports to and imports from the EU as a share of total Canadian merchandise exports and imports and plots the trend of these relative shares. Clearly, the importance of the European trade front to Canadian exporters is diminishing. In addition, the EU is becoming less important as a source of Canadian imports. Within this context, Europe's share of Canada's exports is declining at a faster pace than Europe's share of Canada's total merchandise imports. This is easily seen from the growing distance between the two trend lines as they move from the left to the right.

With respect to services (for example, communications services, business services, financial intermediaries, real estate and insurance services, etc.), Canada's two-way trade with the EU increased by close to 80 per cent over the last decade, from $9.8 billion to $17.6 billion. This equates to a 6.7 per cent annual rate of growth in two-way services trade. Canadian exports of services to the EU led the way, more than doubling (up 110 per cent), compared to a 60 per cent increase of Canadian imports of services from the EU over 1990-1999. In terms of rates of growth, Canadian exports of services grew at an 8.6 per cent annual rate compared to 5.4 per cent for our imports of services from the EU. The overall effect has been to reduce Canada's services trade deficit with the EU from $2.1 billion in 1990 to $1.5 billion in 1999 (Chart 3).

CHART 2

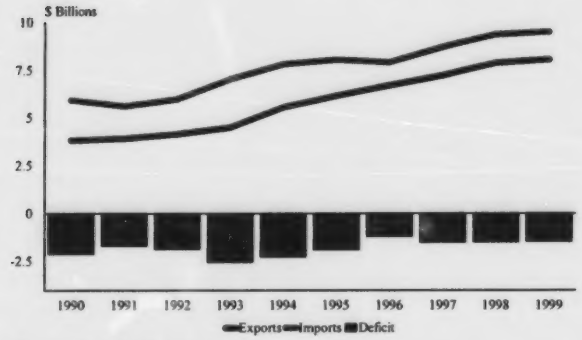
CANADA-EUROPEAN UNION TRADE, 1990 TO 1999
(AS A PER CENT OF TOTAL TRADE AND TREND)



Source: Statistics Canada

CHART 3

CANADA-EUROPEAN UNION SERVICES TRADE, 1990 TO 1999



Source: Statistics Canada

Regional Distribution

Chart 4 illustrates the pattern of Canadian trade with the individual EU member states. Clearly, Canada's trade ties with the EU have been strongest between ourselves and the original six (Germany, France, Italy, and Belgium, the Netherlands, and Luxembourg (Benelux)) and the UK, who account for about 85 per cent of trade in either direction.

The United Kingdom remains our single most important export destination among the European countries. The share of Canada's EU exports destined for the UK rose 1.4 percentage points over the 1990s, to 29.0 per cent in 1999. The UK's export share gain came at the expense of the Benelux countries, who saw their share of Canadian exports to the EU fall by 1.3 percentage points over 1990-99, to 21.3 per cent. Germany and France account for a further 25per cent of Canadian exports to the EU.

On the imports side, the United Kingdom is the most important source of Canadian imports from the EU, although its share has fallen from 28.3 per cent to 25.5 per cent over the decade. Germany is next in importance at 21.8 per cent, reflecting a large and growing bilateral trade surplus with Canada (Table D-8), while France is third in importance at 16.7 per cent (up from 14.1 per cent in 1990).

CHART 4

CANADA-EUROPEAN UNION TRADE BY REGIONS

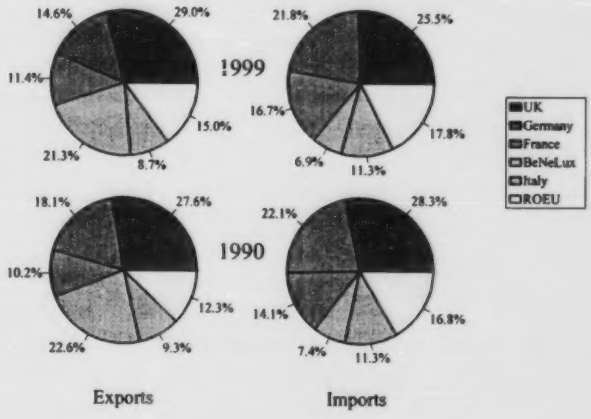
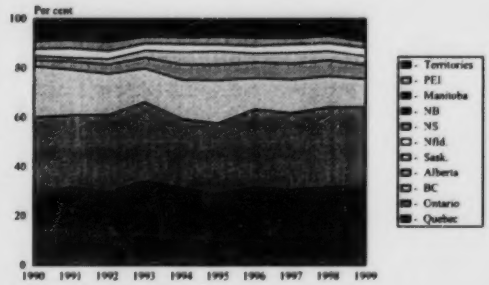


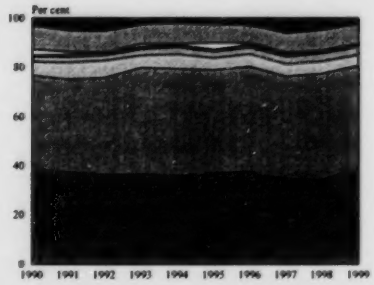
CHART 5

DISTRIBUTION OF PROVINCIAL EXPORTS TO THE EU, 1990 TO 1999



Source: Statistics Canada

DISTRIBUTION OF PROVINCIAL IMPORTS FROM THE EU, 1990 TO 1999



Source: Statistics Canada

Chart 5 examines Canadian trade with the EU from a different perspective – that of the provinces. It is evident that any impacts on changes to Canada-EU trade will be felt most heavily in central Canada, as Ontario and Quebec account for roughly six of every ten dollars of provincial exports to the EU and about eight of every ten dollars of provincial imports. The coastal provinces of British Columbia and Nova Scotia are next in importance, accounting for the lion's share of the remaining trade after the two central provinces have been accounted for.

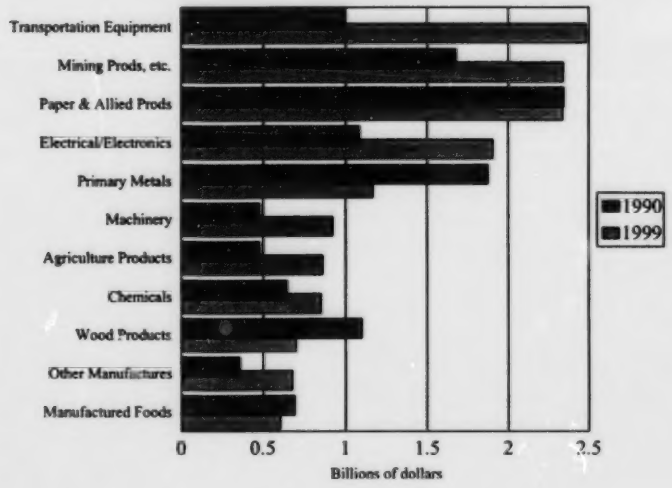
Industry Distribution

Later on in the empirical sections of this paper, we will be discussing sectoral results under various trade policy scenarios. Consequently, it is important to have an understanding of the importance and magnitude of the sectors involved. We have chosen to present the sectoral trade data on the Statistics Canada Standard Industrial Classification (SIC) industry basis. The data are presented for four primary goods industries (agricultural and related services, fishing and trapping, logging and forestry, and mining, quarrying and oil wells) at the one digit SIC level and for 22 manufacturing industries at the two digit level. The interested reader is referred to Statistics Canada Catalogue 12-501 for a complete description of each of the sectors.

The trade data are presented in Charts 6 and 7 below; before examining them, however, a number of comments are necessary. First, the data on exports and imports have been split between two charts each for ease of presentation. The data are arranged in descending order from the largest to smallest importing/exporting sector in 1999. Next, the cutoff point between the "larger" sectors and the "smaller" sectors is $500 million in one-way trade in 1999. Finally, the scale changes from billions of dollars to millions of dollars when moving from the "larger" sector charts to the "smaller" sector charts.

CHART 6

LARGER EXPORTS TO THE EU BY SECTOR, 1990 AND 1999



SMALLER EXPORTS TO THE EU BY SECTOR, 1990 AND 1999

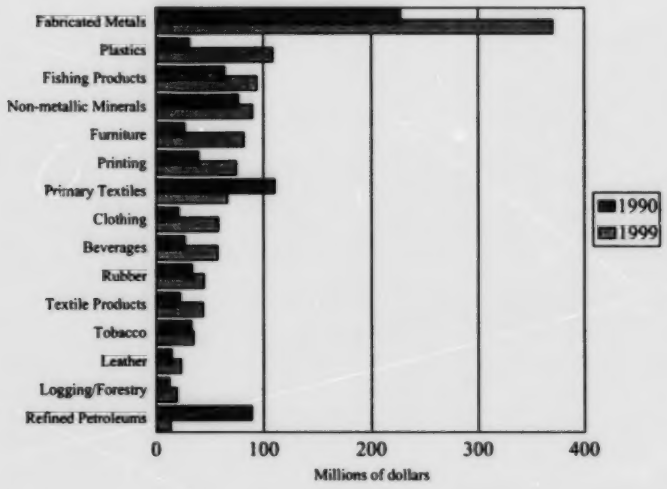
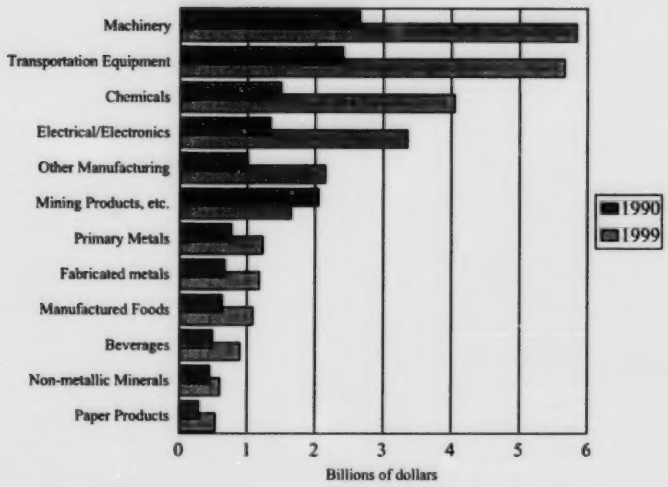
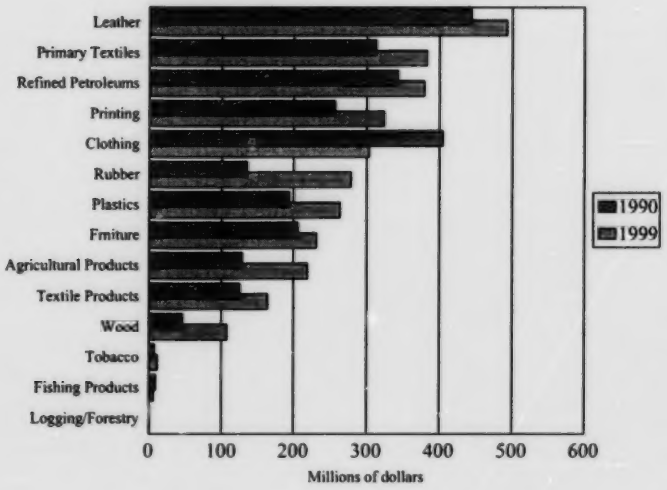


CHART 7

LARGER IMPORTS FROM THE EU BY SECTOR, 1990 AND 1999



SMALLER IMPORTS FROM THE EU BY SECTOR, 1990 AND 1999



Since the Canadian and the EU economies are highly developed, it comes as no surprise that we produce and trade in largely similar products. The first thing of note from the charts above is the considerable overlap of industries between what we export the most and what we import the most. We also trade the most with the EU in the high-tech, high-value added sectors, especially transportation equipment, machinery, electrical and electronic products, chemicals, and miscellaneous manufactures (such as medical instruments and equipment, measuring, controlling, and navigation devices, etc.)

Sectorally, Canada has run trade deficits with the EU in most industries. The exceptions are several natural resource-based sectors: agricultural products, fishing products, logging and forestry, tobacco products, wood products, and paper and allied products. For most of these sectors, the surpluses are small. Only the paper and allied products sector consistently maintained a trade surplus in excess of $1 billion dollars over the 1990s. The primary metals sector saw its trade surplus gradually diminish over the previous decade before finally switching over to a trade deficit in 1999. Finally, the mining, quarrying and oil wells sector recorded a mixture of trade surpluses and deficits with the EU over the past decade.

And while the resources sector, as defined by the various wood, metal, mineral, petroleum and related industries, remain important in total Canadian exports, their share of total exports of goods to the EU has diminished steadily, from nearly 46 per cent to almost 29 per cent, over the 1990s; consistent with the trend towards increased trade in high-tech, high-value-added sectors.

We now turn to some of the impediments to trade between Canada and the EU.

Impediments to Trade Between Canada and the European Union

We have seen above that two-way merchandise trade between Canada and the European Union is in excess of $47 billion. Trade in services adds roughly another third to this total. Given the size of this bilateral trading relationship, it should come as no surprise that a number of bilateral irritants have arisen over the years. Generally, relations are well managed and both partners consult with each other to reduce and resolve trading problems. And when the problems are more contentious, they are examined in a more formal and orderly manner, largely through World Trade Organization (WTO) dispute resolution mechanisms.

Impediments to trade fall into two broad categories: tariff barriers and non-tariff barriers. The tariffs side has seen much progress. For example, over the past four years, the non-weighted average applied EU tariff on total imports has fallen by almost 40 per cent to just over 5.0 per cent, while the corresponding Canadian rate has been cut nearly 29 per cent, to just under 4.6 per cent[8].

However, it should be noted that average applied tariff levels may conceal the fact that some tariff levels remain unchanged, or remain high. In fact, some tariffs may remain prohibitively high and prevent trade entirely, while others may be high enough to keep trade at artificially low levels for market conditions.

Progress in the reduction of non-tariff barriers has been slower, with both the EU and Canada identifying a number of sectors in which they face non-tariff restrictions in each other's markets. Steps to address these issues are ongoing.

Finally, it is also worth pointing out that disputes involving primarily Canada and a single member of the EU can sometimes have broader repercussions as the EU operates on the basis of a common policy and on the basis of solidarity; thus, any dispute with a single member could, in effect, become a dispute with the whole bloc. While this occurrence is rare (e.g., Spanish fishing net sizes) it nonetheless exists. However, to be fair, bilateral disputes generally remain bilateral.

We begin by probing tariff barriers to trade before turning to an examination of the structural and regulatory irritants of concern to both parties.

Canadian Tariff Barriers

High tariff protection in Canada for items such as food products, textiles and clothing (up to 16 per cent for wool and synthetic fibres, and up to 21.5 per cent for clothing), footwear and shipbuilding is of concern to the EU (certain dredgers and most fishing vessels are subject to a 25% tariff). The EU is also concerned about tariff escalation, i.e., tariffs that rise with the stage of processing, as these inhibit non-US exporters trying to export higher value-added products to Canada.

Access to Canada for dairy products, eggs, turkeys, chicken and products thereof is also subject to tariff rate quotas with generally prohibitive out-of-quota tariff rates. Tariff quotas are used to a lesser extent with respect to beef, wheat and barley, and related products.

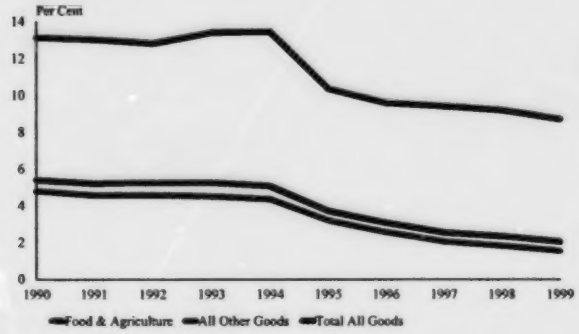
However, in general, Canada's trade weighted tariffs on imports of EU products are less than the corresponding European rates on Canadian exports (see Table D-11 in the data Appendix). There are a few exceptions, notably: footwear, textiles, miscellaneous manufactures, and precious and semi-precious stones and metals. Canadian and European tariffs on prepared foods and beverages are approximately the same on a trade weighted basis.

Some 48 per cent of all industrial imports from the EU entered Canada duty free. A further 15 per cent of these imports came in at less than 5 per cent duty. Another 25 per cent of industrial imports entered at rates of duty between 5 and 10 per cent. The remaining 10 per cent faced tariffs of between 10 and 25 per cent. There were no industrial imports from the EU with applied tariff rates in excess of 25 per cent.

Canadian agri-food and agricultural imports from the EU comprise roughly 7 per cent of total imports from the EU. Duties were negligible in many agricultural sub-sectors, except for the aforementioned tariffs on prepared foods and beverages, which amounted to 12.5 per cent on a trade weighted basis. Overall, Canadian tariffs on imports from the EU have fallen by over 60 per cent on a trade weighted basis over the 1990-1999 period (Chart 8).

CHART 8

CANADIAN TARIFFS ON EU IMPORTS (TRADE WEIGHTED)



Source: Statistics Canada

EU Tariff Barriers

Canadian exporters of fish, shrimp, and seafood products continue to be disadvantaged by high EU tariffs. The EU groundfish tariffs on many items of interest to Canada fall within the range of 12 to 23 per cent. Coldwater shrimp exports similarly face tariffs ranging from 12 to 20 per cent depending on the product form, although some tariff relief has been offered through Tariff Rate Quotas (TRQ). In April 1999, the European Union opened a 4,000-tonne autonomous TRQ for cooked and peeled shrimp, whereby the product was subject to a reduced duty of 6 per cent if imported for further processing in the European Union. EU Member State fisheries ministers decided in December 1999 to extend the TRQ for a further three years and to increase the quantity to 5,000 tonnes annually. However, Canadian shrimp producers seek fuller access and do not enjoy the tariff preferences of their Norwegian and Icelandic competitors. Primarily because of these barriers, Canadian fish and seafood exports to the European Union have continued to diminish.

More broadly, by 1999 the average tariff rate levied by the EU on industrial imports had fallen to around 4.3 per cent from about 5.7 per cent in 1995. Underlying this downward movement were two developments operating in opposing directions: the post-Uruguay Round effects of multilateral trade liberalization that were pushing average tariffs to lower levels and the tariffication of non-tariff barriers in agriculture, which had the effect of lifting average tariffs higher.

Of total 1998 exports from Canada, 52 per cent entered the EU duty free while another 34 per cent were subject to positive tariffs up to 5 per cent. Only about 14 per cent of Canadian exports to the EU faced tariffs in excess of 5 per cent.

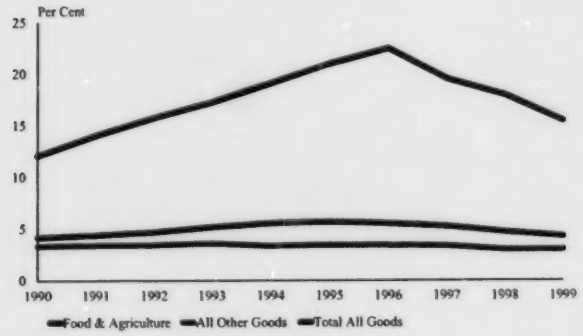
Food and agricultural-related products are one of the key commodity groupings that frequently face high tariffs. Agricultural products represent about ten per cent of total Canadian exports to the EU and roughly half of these exports face tariffs of 5 per cent or higher. In point of fact, agricultural commodities are the only products which face European import tariffs in excess of 35 per cent.

Currently, the average tariff applied to Canadian agricultural and food exports to the EU stands at about 15.5 per cent, down a third from a peak rate of 22.5 per cent applied in 1996. Only one-third of all agricultural products enter European markets duty free (Chart 9). On the other hand, we cannot say precisely how many agricultural products have been foreclosed or significantly hindered from entering EU markets because of high tariffs.

In contrast, slightly over one-half of all industrial products enter Europe duty free. And another one-third enter Europe at tariff rates of less than 5 per cent. A handful of other sectors face duties above 5 per cent in significant proportions, including: vehicles and transportation equipment, pulp and paper, chemicals, textiles, and certain base metals. These sectors, along with agriculture, are likely to be most sensitive to any changes in European tariffs.

CHART 9

EU TARIFFS ON CANADIAN IMPORTS (TRADE-WEIGHTED)



Source: Statistics Canada

Canadian Non-tariff Barriers

In addition to tariffs, Canada maintains a number of non-tariff barriers which could impede the penetration of European imports into the Canadian market. Foreign investment restrictions and branch banking legislation are issues of contention for the EU. Similarly, the EU has been concerned about the practices of provincial liquor boards with respect to their purchases of wines and spirits. The EU also views the variety of differing provincial regulations and procurement practices as negatively affecting international trade. Appendix A provides a synopsis of the principal concerns of the EU regarding Canadian non-tariff barriers.

EU Non-tariff Barriers

Likewise, a number of bilateral irritants have arisen over the years which have affected Canadian trade interests in Europe. For example, the fact that the EU has been unable to proceed on approvals for all GMO canola varieties cultivated in Canada has kept this product out of EU markets since 1995, amounting to an annual trade loss approaching $450 million. Canadian hormone-treated beef remains barred from the EU market, despite WTO panel decisions that this product does not present a health risk to consumers. In the wake of past food-safety scandals in the EU, European Commission and Member State positions on consumer health and safety issues have grown more cautious, and factors other than scientific considerations appear to be growing in influence.

Canadian exporters of green lumber have been shut out of the EU market since 1993 due to differences of view over appropriate measures required to control the phytosanitary risk posed by the Pinewood Nematode, a microscopic worm – notwithstanding a longstanding history of exporting this product to the UK. However, the most serious non-tariff barriers from the Canadian perspective are to be found under the Common Agricultural Policy (CAP) and its system of generous domestic support and export subsidies which has prevented Canada from realizing its full potential in the EU markets for its agricultural exports. A more complete rundown of the issues and concerns is contained in Appendix A.

One over-arching issue that could have an impact on Canada-EU trade is that of the impact of enlarging the EU. This is the focus of the next section.

EU Enlargement: Implications for Non-EU Trading Partners

As of 1999, 13 countries in Eastern and South/Central Europe and have been accepted as official candidates to join the EU[9] (Table 1). It is expected that as early as December 2002, the EU will have decided to invite a number of candidates to join the EU, after concluding that they have fulfilled the Copenhagen criteria[10] for membership and upon completion of negotiations with them. The remaining candidates will join in succeeding years. This enlargement will add one-third more to the EU territory and roughly 30 per cent more to its population. Currently, the applicant countries as a whole represent the second largest trading partner of the EU after the US, accounting for 15 per cent of its exports and 12 per cent of its

imports in 1999. If the new applicants were added to the Union as of today (so that it becomes EU-28) the EU would represent 36 per cent of GDP of the OECD countries — placing it at about par with the US in economic importance.

Whiie Canada welcomes the EU enlargement, it is concerned over possible trade diversion[11], even though our merchandise trade with the thirteen candidate countries amounts to a small proportion of our trade. The anxieties are as real as they were earlier in the 1990s over trade diversion concerns surrounding Fortress Europe '92 and the establishment of the single market. Canada is also concerned about the extension of other trade distorting elements of EU policy, in particular, extending the CAP to the Applicants. Over the short-term, there can be little doubt that the EU enlargement will have both positive and negative economic implications for the rest of its trading partners, including Canada. The basis for this proposition is that the elimination of internal barriers will increase the EU demand for goods and services produced within its own enlarged territory. Prices for these newly "internalized" goods and services will be relatively cheaper in comparison both with those existing before the accession of the new members and in comparison with those from non-EU sources. This will place the goods and services from the Applicants at a competitive advantage vis-à-vis all external trading partners, including Canada.

TABLE 1

APPLICANT COUNTRIES WANTING TO JOIN THE EUROPEAN UNION

Country	Date Europe Agreement Signed	Date Agreement Came into Force	Official Application for EU Membership
Turkey	September 1963*	December 1964*	April 14, 1987
Malta	December 1970*	April 1971*	July 16, 1990
Cyprus	December 1972*	June 1973*	July 16, 1990
Hungary	December 1991	February 1994	March 1994
Poland	December 1991	February 1994	April 1994
Romania	February 1993	February 1995	June 1995
Bulgaria	March 1993	February 1995	December 1995
Slovakia	October 1993	February 1995	June 1995
Czech Republic	October 1993	February 1995	January 1996
Latvia	June 1995	February 1998	October 1995
Estonia	June 1995	February 1998	November 1995
Lithuania	June 1995	February 1998	December 1995
Slovenia	June 1996	February 1999	June 1996

* Association Agreement

It can also be argued that EU enlargement could result in trade creation between the EU and its non-EU trading partners over the longer-term, offsetting the short-term effects noted above. This is because it can be expected that the enlargement will translate into additional economic growth for the EU with a resulting higher demand for goods and services, including those produced in non-EU countries. In addition, non-EU countries will benefit from the elimination of exchange rate risks and from lower transaction costs due to the adoption of the single currency throughout the enlarged EU (should the new members adopt the euro). The EU enlargement will likely mean greater transparency for trade relations, and further predictability and security of trade.

However, there could also be negative long run implications from the EU enlargement for Canadian international trade. First, the exports of the expanded EU to third markets would be relatively more competitive, possibly crowding out exports to non-EU countries and diverting certain portions of our trade. Moreover, in the area of economies of scale, if the enlarged EU can achieve even more efficient operations of scale on its own, then reductions in imports from outside the EU would seem likely. The net trade effect of the EU enlargement on non-EU economies could thus be negative in the long run if the impact of these negative effects outweighs the positive economic growth effects of the EU.

This, perhaps, helps to explain why many transnational corporations, particularly from the US, have been reallocating resources to the EU. It may be their way of forestalling any potential negative impacts from EU enlargement as a result of the greater integration. Thus, there is a genuine reason to assert that the EU enlargement could have some adverse economic effects on the non-EU economies. The strength and extent of the negative effect for a given non-EU economy, however, would depend on the post-enlargement economic relationship between the EU and her non-EU trading partners. Some of these effects will be examined later on when we discuss the computable general equilibrium (CGE) model results.

This concludes our examination of the recent changes in Canada-European trade patterns. We now turn to examining investment relations between Canada and the European Union member states.

INVESTMENT

Why Liberalize Investment?

Before examining the recent patterns of Canada-EU FDI, it is helpful to review what causes firms to invest in foreign markets in the first place[12].

As a starting point, there is no agreed general theory of foreign investment, but there are important theoretical strands from the analyses of firm behaviour based on transactions costs, locational factors, and business strategies. Transaction-cost theories point to various circumstances where "internal" transactions (i.e., within a firm) may contribute more than external, market-based transactions to maximizing the return on a firm's assets.

Direct investment allows the firm to internalize such costs, to avoid certain risks and achieve greater predictability with respect to input costs and quality.

The nature of a firm's foreign involvement also depends partly on the interaction of firm-specific assets with the location-specific advantages of different countries. The latter, in turn, depend on a range of elements including factor costs, labour productivity, exchange rate variations, transportation costs, market size and growth, and public policies.

Finally, business strategy will influence the way a multinational enterprise will distribute and organize their activities so as to increase competitiveness and reduce other perceived risks, including the threat of adverse government policies. For example, a multinational enterprise may establish a foreign subsidiary to prevent rivals from pre-empting markets or sources of supply. And a multinational enterprise's strategy is likely to be influenced by its country of origin or by sectoral considerations.

Deepening European integration, as exemplified by the "Fortress Europe" label that was quickly attached to the EC-92 initiative, is one such example of a perceived threat of an adverse government policy. From an outsider's (i.e., North American) vantage, the EC-92 initiative raised questions about trade diversion away from non-European sources to "internal" European sources. In this case, a multinational enterprise may have established or contemplated establishing a foreign subsidiary (either through acquisition of a European company or by "greenfield" investment) in Europe so as to not be shut out from European customers.

Barriers to investment make access to foreign markets uncertain. By clarifying investment rules, trade agreements diminish such uncertainty, encourage risk taking, and increases the attractiveness of the free trade area as a place to invest.

Recent Changes in Canada-European Investment Patterns

Overview

In 1999, Canada's direct investment in the EU amounted to $48.9 billion, accounting for 19.0 per cent of Canada's total outward foreign direct investment (FDI) stock. The United States had the largest share at $134.4 billion, or 52.2 per cent of total Canadian Direct Investment Abroad (CDIA). At the aggregate level, Canadian investors have increased their direct investment in the EU by nearly 247 per cent over 1988-1999. This rate of increase is slightly greater than that for total Canadian direct investment abroad (223 per cent) and, contrary to popular perception, is considerably greater that the growth rate of Canadian direct investment going to the United States (163 per cent) over the same period (Table D-13).

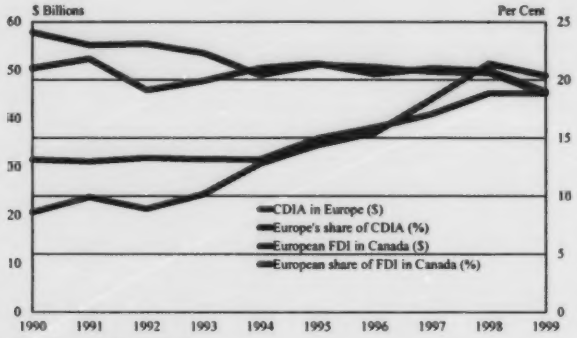
In 1999, the stock of FDI in Canada from the European Union was $45.2 billion, accounting for 18.8 per cent of Canada's total inward FDI stock (Table D-14). Again, the US had the largest share at $173.3 billion, or 72.2 per cent of total FDI in Canada. While Canadian investors seem keen on investment opportunities in the EU, it appears to be less true of European investors with respect to Canada. Total EU direct investment in Canada climbed

some 77 per cent over 1988-1999 to reach the $45.2 billion mark. This rate lags far behind the rate for total foreign direct investment (FDI) in Canada (110 per cent) and is even further behind the rate for US FDI in Canada (128 per cent).

Put another way, these statistics indicate that Canadian firms have reversed the long-standing situation of Canada being a net importer of capital vis-à-vis the European Union. Canada became a net exporter of capital to the European Union countries in 1996 (Chart 10) – one year after Canada became a net exporter of capital to the world for the first time in its history[13] (Table D-15).

CHART 10

CANADA-EU INVESTMENT PATTERNS, 1990 TO 1999



Source: Statistics Canada

Regional Distribution

In 1988, roughly 62 per cent of all EU direct investment in Canada originated from the UK and approximately 62 per cent of all Canadian direct investment in the EU was placed in the UK. However, by 1999, these figures had changed dramatically: only 31.5 per cent of total EU direct investment in Canada came from the UK while some 46.8 per cent of total Canadian direct investment in the EU was invested in the UK. This represents relative share declines of approximately 50 per cent and 25 per cent, respectively. In terms of total FDI in Canada from all sources, the UK share fell from nearly 14 per cent in 1988 to under 6 per cent in 1999. Similarly, though less pronounced, the share of Canadian direct investment in the UK in total CDIA fell from 11 per cent in 1988 to about 9 per cent in 1999. Overall, the stock of Canadian direct investment in the UK jumped 160 per cent to $22.9 billion while the stock of British investment in Canada fell 9 per cent to $14.2 billion, over this period.

France, like the UK, has also seen a 25 per cent drop in its share of Canadian direct investment in the European Union, from 10.4 per cent in 1988 to 7.7 per cent in 1999. However, French investors have been relatively more upbeat about investing in Canada, investing quite heavily in Canada. As a result, their share of EU direct investment in Canada jumped from 8.7 per cent to 14.2 per cent over 1988-1999. This represents a relative increase of over 60 per cent in France's share of European direct investment in Canada. Again, putting these shares in terms of total investment, France's share of total CDIA fell to 1.5 per cent from 1.8 per cent, while her share of FDI in Canada rose to 2.7 per cent from 1.9 per cent. To put this in perspective, Canada's direct investment in France grew 160 per cent to $3.8 billion over 1988-1999, slightly lower than the pace for total CDIA (223 per cent). At the same time, France's direct investment in Canada outpaced that for total FDI in Canada over this period by a considerable margin – 191 per cent to 110 per cent. By 1999, French FDI in Canada totalled $6.4 billion.

The Netherlands, Ireland, and Germany have seen the value of Canadian direct investment in their jurisdictions rise roughly five-fold or more over the 1988-1999 period. As a result, their individual shares of total CDIA to the EU have risen by 7.2 percentage points, 5.4 percentage points, and 3.8 percentage points, respectively. More recently , Sweden's share of CDIA in the expanded EU has risen from 0.2 per cent in 1995 to 1.6 per cent in 1999.

Overall, there appears to be a growing maturity or a widening of interests among Canadian investors. The investment focus has shifted away from the traditional markets for investment in Europe – Britain and France – towards opportunities elsewhere within the Union. Moreover, the EU has held onto and even slightly increased its share of total CDIA, whereas the United States has seen its share of CDIA fall steadily. At the same time, with the exception of the UK, most EU countries have maintained their shares of total FDI in Canada. The British, on the other hand, have seemingly become apathetic to investing in Canada: the nominal value of the stock of UK FDI in Canada fell just over nine per cent over the 1988-1999 period.

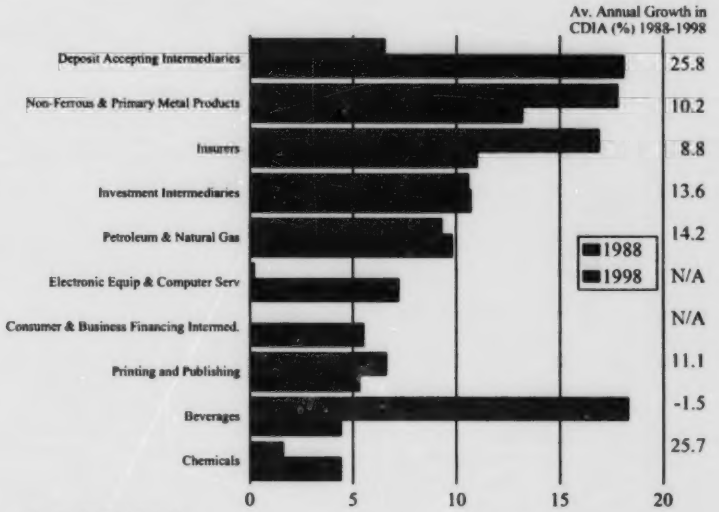
Industry Distribution

Canadian Direct Investment in Europe

In 1998, Canadian firms placed some $34.3 billion of direct investments in ten EU industries (Chart 11)[14]. This investment amounted to approximately 89.7 per cent of total CDIA in the EU. The financial services industries, especially *Deposit accepting intermediaries, Insurers, Investment intermediaries,* and *Consumer and business financing intermediaries,* are particularly favoured sectors for direct investment – accounting for $17.3 billion (or 45.3 per cent) of the total CDIA in the EU. Resource-based industries, namely *Non-ferrous metals and Primary metal products,* and *Petroleum and natural gas,* were also large recipients of Canadian direct investment in 1998.

CHART 11

INDUSTRY DISTRIBUTION OF CDIA IN THE EUROPEAN UNION, 1988-1998 (TEN LARGEST SECTORS)



Source: Industry Canada

However, within these top ten industries for CDIA in the EU, the shares have changed considerably for some industries. For example, *Deposit accepting intermediaries* (i.e., banks and near banks) has seen its share rise 11.6 percentage points, from 6.5 per cent in 1988 to 18.1 per cent in 1998, to become the most important sector. On the other hand, *Beverages* has seen its share fall 13.9 percentage points, from 18.3 per cent in 1988 to 4.4 per cent in 1998.

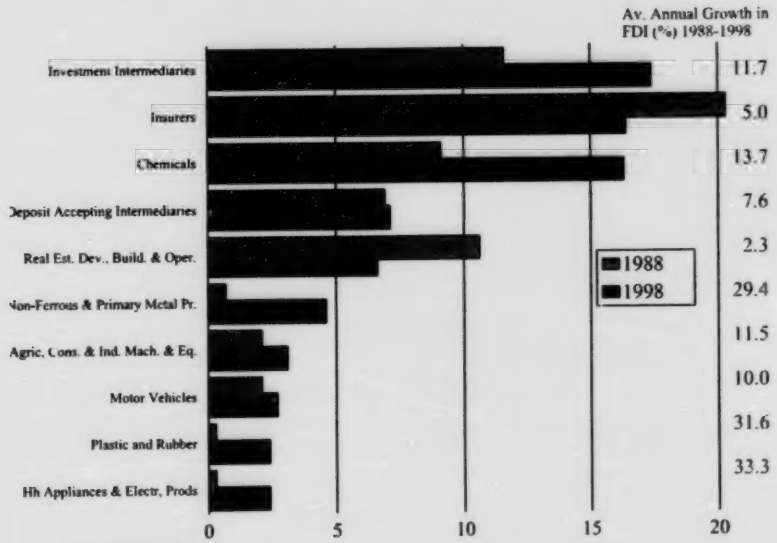
European Direct Investment in Canada

On the inward investment side[15], the top ten industries accounted for $25.7 billion, or 79.0 per cent, of total FDI from the EU in 1998 (Chart 12). Similar to the sectors favoured by Canadian investors in the EU, financial services industries fall among the largest sectors targeted by European investors, accounting for some $13.3 billion (or 40.9 per cent) of the total FDI in Canada from the EU. The remaining industries are mostly manufacturing industries. With the exception of *Non-ferrous metals and Primary metal products*, the list does not include resource-based industries.

Industry shares have changed less on the inward foreign investment side than on the outward investment side. Within the top ten industries for EU FDI in Canada, the share of *Chemicals* showed the largest increase, rising from 9.1 per cent in 1988 to 16.3 per cent in 1998. In the financial industries, the share of *Investment Intermediaries* increased from 11.6 to 17.4 per cent while the share of *Insurers* fell from 20.3 to 16.4 per cent.

CHART 12

INDUSTRY DISTRIBUTION OF FDI FROM THE EUROPEAN UNION, 1988-1998 (TEN LARGEST SECTORS)



Source: Industry Canada

On the whole, there appears to be considerable inward and outward investment activity in financial services, which is not unexpected given the trend towards growing globalization in this area. Most likely, firms are seeking out merger and acquisition opportunities to increase economies of scale and specialization. Similarly, there is considerable two-way investment in the *Chemicals* sector. Possible reasons could include specialization of production on a global scale, acquisitions to obtain intellectual property rights (e.g., patents and processes), or seeking economies of scale.

III. Modelling Trade Flows Between Canada and Europe

The gravity model has long been the workhorse for empirical studies of the pattern of trade. These models are recognized for their consistently high explanatory power with regard to trade flows between countries and can be useful for estimating changes in the trading relationships among countries.

The gravity model assumes that the volume of trade between two countries should increase with their population and with *per capita* incomes, since large and rich countries should trade more than small and poor ones; and, it should diminish as economic or geographic factors (such as distance) increase, since these factors tend to increase information, transportation, or transaction costs. In addition, a number of empirical papers incorporate variables such as relative price changes, language, and tariffs and exchange rates to their model to help explain bilateral trade flows.

Since the purpose of this study is to assess the implications of a free trade agreement between Canada and the European Union, the standard gravity model has been modified to include tariff effects on bilateral trade. A more thorough description of gravity models along with the precise specifications and detailed regression results can be found in technical Appendix B.

Canadian Exports to the European Union

Regression results for aggregate Canadian exports to the European Union are presented below. The variables are expressed in logarithmic values and the coefficients provide immediate estimates of what economists call "elasticity" measures. In other words, they show the percentage change of the dependent variable (i.e., total Canadian exports to the EU) as a result of a percentage change in the explanatory variable (e.g., tariffs). For example, a one per cent reduction in EU tariffs would translate into a 3.36 per cent increase in Canadian exports to the EU (= -1% multiplied by -3.36). The other figures in the table show *t*-statistics and are used to indicate whether the coefficients are significantly different from zero.

Broadly speaking, positive coefficients signal that Canadian exports to the EU rise when the corresponding variable increases and negative coefficients imply that Canadian exports to the EU fall when the corresponding variable increases.

TABLE 2

EXPORTS FROM CANADA TO THE EUROPEAN UNION (SINGLE TARIFF COEFFICIENT)

Variable	Coefficient	t-Statistic*
Product of GDP per capita	0.476	9.556
Product of population	1.149	43.241
Distance	-4.460	-11.880
EU tariff	-3.357	-2.397

* All coefficients are significant at 95% significance level.

Looking at the set of regression results for aggregate Canadian exports to the EU, most of the parameter signs are in line with reasonable expectations[16] (Table 2). That is to say that rising incomes, as measured by the product of GDP per capita, and rising populations contribute positively to exports, while tariffs do not. The coefficient on *Distance* suggests that the farther a country is from Canada the smaller are Canadian exports to that country.

Finally, these aggregate results show that European tariffs have a negative impact on Canadian exports, and that the impact is statistically significant[17]. As mentioned above, the value of the coefficient on *EU tariffs* indicates that a one per cent reduction of EU tariffs translates to a 3.36 per cent increase in potential Canadian exports to the EU. Elsewhere in this study, it is also reported that the trade-weighted average tariff faced by Canadian exports to the EU stands at just below 4.3 per cent[18]. This suggests that the complete elimination of tariffs on Canadian goods into Europe would raise Canadian exports by approximately 14.4% or by $2.3 billion. In simple terms, Canadian exporters would benefit from the elimination of EU tariffs.

CANADIAN IMPORTS FROM THE EUROPEAN UNION

The analysis now turns to examine the impact of Canadian tariff elimination applied to Canada's imports from the EU at the aggregate level. As before, the complete regression results are reported in Appendix B. The key results are reported in Table 3 below. The first observation of note is that the signs of the key coefficients are as expected: Canadian tariffs have a negative impact on imports from the European Union; changes in Canadian and foreign GDP per capita as well as changes in population (coefficients on *Product of GDP per capita* and *Product of population*) have the expected positive impacts on imports from the EU; and greater distances between Canadian destinations and European sources have negative impacts on imports from the EU.

TABLE 3

IMPORTS INTO CANADA FROM THE EUROPEAN UNION (SINGLE TARIFF COEFFICIENT)

Variable	Coefficient	t-Statistic*
Canadian tariffs	-5.466	-10.180
Product of GDP per capita	0.562	9.106
Product of population	1.189	41.551
Distance	-2.800	-7.358
Canadian tariffs applied to the US	8.583	6.592

* All coefficients are significant at 95% significance level.

The coefficient on *Canadian tariffs* is somewhat large in value, and significant. It implies that a one per cent reduction of Canadian tariffs would raise Canada's imports from the EU by approximately 5.5 per cent. Thus, European exporters could benefit substantially from the elimination of Canadian tariffs: if all Canadian tariffs were to be eliminated, the EU could increase its exports to Canada by about 11.4 per cent, or some $3.6 billion.

The reduction of Canadian tariffs against US goods has a negative impact on imports from the European Union. In essence, the positive coefficient on *Canadian tariffs applied to the US* means that higher tariffs on imports from the US would increase imports from the EU. And, correspondingly, the opposite also holds true – lower tariffs on American goods reduces imports from the EU. In effect, the reduction of tariffs vis-à-vis the Canada-United States FTA (and extended under the NAFTA) are quite important in explaining the changes in imports from the EU over 1988-1999. The reductions in Canadian tariffs applied to US imports under the FTA/NAFTA overshadow the reductions of tariffs on European goods vis-à-vis multilateral negotiations. Moreover, NAFTA has meant a complete elimination of large number of tariffs and a simplification of custom declarations and procedures, thereby reducing transactions costs.

SECTORAL ESTIMATIONS

The above analysis has measured and reported on the overall or aggregate effects. However, total effects sometimes mask significant changes in the underlying components, particularly when examining the impacts of tariff reductions at the sectoral level. For the purposes of this study, we disaggregated Canadian trade with the EU by some twenty goods sectors. The sectoral definitions correspond to the section headings used in the Harmonised System of Classification.

In order to get a coherent framework of analysis at the sectoral level, special care was taken when constructing the database to classify both trade and tariff data using the same nomenclature. The procedure eliminates any measurement error which might originate from differences in commodity grouping between trade and tariffs collected.

Table 4 summarizes the overall performance of the detailed estimations in the sense that they provide tariff elasticities having the theoretically correct sign. The results are not all that surprising. Studies which take a uniform approach to estimating disaggregated elasticities usually end up with mixed results – that is, some coefficients end up with the (correct) anticipated sign while others do not. For example, Létourneau and Lester (1988) estimate Canadian import price elasticities for 70 categories using four different import demand models. Of their results, at least one of the four models generated elasticity coefficients with the incorrect sign in 54 of the 70 categories. Indeed, in some 13 instances, not one of the four models generated elasticity estimates with the correct signs. Moreover, the elasticity estimates varied considerably across the four models – by as much as a factor of 7.9 times between the smallest and the largest coefficient estimate for the same category.

The interested reader will find the sectoral results in Appendix B. Because of the mixed results, we will not discuss the results in any detail except to note that, first, they tend to fall in line with the aggregate estimates in terms of expected increases from tariff elimination. For example, elimination of tariffs on Canadian exports to the EU would be expected to increase Canadian exports to this region from $1.6 billion to $4.1 billion (line 3 in the Table 4), a range which comfortably captures the $2.3 billion estimated earlier. Similarly, elimination of Canadian tariffs on EU imports would be expected to raise imports from Europe by $2.9 billion to $3.6 billion – quite similar to the $3.6 billion estimated from the aggregate imports equation.

TABLE 4

GLOBAL ESTIMATION RESULTS OF THE DISAGGREGATED APPROACH

	Exports to the EU[1]	Imports from the EU[2]
Negatively signed	10	17
Negatively signed and statistically significant[3]	5 + 2	11 + 3
Expected increase from tariff elimination[4] ($billions)	1.6 → 4.1	2.9 → 3.6

1 20 categories
2 21 categories
3 Significant at the 95% level + significant at the 80% level
4 From tables B.9 and B.11.

A Word of Caution About These Estimates

As with any econometric analysis, the standard caveats apply. Simply put, an econometric model is a simplification of the phenomenon it is trying to capture and variables other than those included in our analysis should be included in the model to fully assess the trade relationship between Canada and the EU. The most obvious of omissions are the various non-tariff barriers (NTBs) discussed in Appendix A, since these could effectively reduce or even annul our predictions of expansion of trade arising from tariff elimination. On the other hand, because of their very existence, non-tariff barriers may be hindering the free flow of goods and services between the two trading partners and our estimates can, therefore, be regarded as minimum impacts. Because of the two forces working in opposite directions, we would recommend further detailed analysis of NTBs — work that is beyond the scope of this study. In addition, one may also want to include the trade and tariff data of Canada's and the EU's major trading partners - such as the US, Japan, and the thirteen Applicant countries.

High tariff barriers are also particularly troublesome for these types of estimates. High tariffs may either prohibit or severely hamper the free flow of goods and, consequently, either distort the econometric results or render them ineffective in modelling the true trading relationship. At the extreme, a tariff reduction to a commodity may have no trade creation or trade expansion effect if the resulting "reduced" tariff remains truly prohibitive. We would recommend that these commodities be examined under separate study.

Another potentially complicating factor is the issue of rules of origin. If rules of origin requirements are sufficiently restrictive, they could cause certain manufactured goods that use imported inputs extensively to fail to meet the threshold rules of origin requirements to qualify for privileged treatment under a free trade agreement. In this case, there would be no tariff reductions applied and, hence, no expansion of trade arising from tariff elimination.

More particular to this study, the EU traditionally applies its own rules of origin regime in its bilateral trade agreements. Because many Canadian industries have rationalized on a north-south basis and utilize a high level of imported inputs, they might not be able to take advantage of the preferential tariff treatment afforded under a free trade agreement with the EU. This could result in a reduction of the expected benefits.

Our modelling exercise deals with trade in goods. However, we have not introduced the foreign investment component into the analysis. There is well documented evidence that trade and investment are complements rather than substitutes (see, for example, Hirshhorn (1997), Cameron (1998)). Hirshhorn (1997) reports on research done by Industry Canada suggesting that the elasticity of exports to direct investment is positive and relatively high. Thus, a Canada-EU FTA accompanied by our already existing growing net exporter of capital position with the EU bodes well for Canada and suggests that our export pace to the EU would likely pick up significantly relative to imports from this region. Again, this goes beyond the scope of the analysis of this paper and is a factor for further research.

Finally, we conclude our words of caution on three technical notes. First, when dealing with tariff data, there is the question of tariff aggregation. Tariffs are usually applied to imports defined at much finer levels of disaggregation, so using aggregated tariff data by HS sector may unintentionally bias the results. Secondly, the broad aggregation of data results in only a general description of how the average or representative product may be affected. Individual products may or may not be affected to the same extent or move in the same direction as suggested by the broad results. Finally, using all available data in a single regression might not be the ideal way to analyse the impact of tariffs on trade within a specific import/export sector[19]. Indeed, our first idea was to perform a Seemingly Unrelated Regression (SUR) system and run 21 separate regressions for the sectors independently, while taking into account contemporaneous error term correlation between sectors. However, after obtaining poor results, this approach was dropped in favour of the approach taken in this paper.

IV. THE COMPUTABLE GENERAL EQUILIBRIUM RESULTS

INTRODUCTION

THE COMPUTABLE GENERAL EQUILIBRIUM (CGE) approach looks at the economy as a complete system of interdependent components (e.g., industries, households, investors, governments, importers, and exporters). This approach explicitly recognizes that economic shocks on any one component can have repercussions throughout the system and that accounting for these repercussions may be essential in assessing the effects of the shocks. What is more important, a CGE model provides quantitative data to perform empirical analysis of a variety of policy problems. For the purposes of this study, we are using a multi-region, CGE model known as the Global Trade Analysis Project (GTAP) model. The GTAP model allows us to conduct applied policy-oriented research in international trade. Specifically, we will be measuring the impacts of a free trade agreement between Canada and the European Union by examining a series of free trade scenarios involving the EU, Canada and Applicants, both with and without liberalization in agricultural trade.

The difference between the econometrics and CGE approaches amount to differences between partial and general equilibrium modelling. Essentially, with the econometrics approach we assume a partial equilibrium state and model the first order effect of the Canada-EU trade relation, assuming that the rest of the world remains unchanged and does not react in any manner to a change in the Canada-EU trade relation. Under the CGE approach, we lift the assumption that the rest of the world remains fixed by permitting them, and subsequently all parties, to adjust in response to the change in conditions in the Canada-EU trade relation.

To focus the analysis and keep the volume of results manageable, the database was aggregated into six regions and ten sectors. The choice of the regional and sectoral aggregates is defined by the purpose of this study. The regions include Canada, the US, Mexico, the EU, the Applicants, and the rest of the world (ROW). Sectoral aggregates include *Agriculture, Mining, Processed food, Textiles and apparel, Iron and steel, Machinery and equipment, Transportation equipment, Chemicals, rubber and plastics, Other manufacturers,* and *Services.*

Database Modifications

The reference year for the standard GTAP database is 1995. All important economic data such as volumes, the structure of production, labour inputs, capital stock, and tariff barriers refer to the world in that year. However, certain important policy developments have taken place since 1995. In particular, we give special consideration to the NAFTA and the Mexico-EU Free Trade Agreements. Following US ITC (2000) methodology, the standard GTAP database has been modified to reflect an environment in which all policy measures under the NAFTA and Mexico-EU FTAs are completely implemented. This updated data set is used as the base data

for this study. Tariff changes associated with these developments, with the exception of tariffs for *Agriculture* and *Processed food* between EU and Mexico, were also taken from ITC (2000). Therefore, all results reported here should be considered as if a Canada-EU FTA took place in 1995 and that the NAFTA and the Mexico-EU FTA were completely applied.

More specifically, with the exception of tariffs for *Agriculture* and *Processed food* between EU and Mexico, tariff rates have been updated according to the ITC study. Under the Mexico-EU FTA, the EU gained preferential access for a number of uncontroversial agricultural commodities, for example, beer, certain vegetables, fruits and fruit juices, liquors and spirits, cut flowers, tomatoes, pectic substances and tobacco. Tariffs on wines have been reduced from 20 per cent to 15 per cent and Mexico will also be gradually eliminating tariffs on olive oil. Certain Mexican agriculture products also gained preferential access to EU markets, for example, coffee, avocados, cut flowers, fruits and juices, and honey[20]. However, the important but sensitive agricultural products, such as meats, grains, and dairy products, are either excluded from the agreement or are subject to quota restrictions.

It is also necessary to take into account non-tariff barriers in the international exchange of agricultural goods. To the extent that such barriers exist, the "zero" tariff barriers in *Agriculture* and *Processed food* suggested by the ITC study seems to overstate the actual degree of agricultural trade liberalization between the EU and Mexico. On the other hand, the tariff rates contained in our GTAP database (and calibrated to 1995) overstate the actual degree of tariff protection in the trade of food and agriculture between the EU and Mexico. In the absence of better information, along with the observation that EU-Mexico trade liberalization in agriculture was only partial and that all key non-tariff barriers remain intact, we have chosen to keep the tariffs contained in the GTAP data base. That is, we have kept the EU tariffs on imports from Mexico in *Agriculture* at 15.3 per cent and the corresponding Mexican tariffs on imports from the EU at 3.43 per cent, while in the *Processed food* sector, the EU tariff rate remains 29.99 per cent and the Mexican rate stays at 7.88 per cent [21] (Table C4).

The Common Market for Agriculture

The agreement between the candidates for accession and the EU with regards to agricultural policy in this round is likely to be different from previous rounds. While previous accessions led to full membership of the acceding countries in the Common Agricultural Policy (CAP), it is unlikely that this policy will be extended to East European countries without significant modifications. The EU would likely face serious budgetary problems and strong pressure from other trading partners if it were to attempt to subsidize farmers in the accession countries to the same extent that it subsidizes farmers in current Member States (Josling et al, 1998). Instead, it is more likely that the EU will continue its current policy of providing preferential access for East European producers of agricultural goods to the European market while reducing the export subsidies on its own products supplied to the markets of the accession countries.

This policy may lead to the formation of something that we call a "common market for agriculture" (CMA). It features the elimination of tariffs and subsidies between the EU and Applicants and establishes common external tariffs for agricultural products, but it does not enable the Applicants to subsidize their agricultural exports to the same extent as would be possible under the CAP. The CMA appears to be a more realistic enlargement scenario among several alternatives, namely, the *status quo*, adoption of the CAP, or full liberalization of trade in agriculture.

Scenarios

Four scenarios have been developed to address various aspects of a possible Canada-EU free trade agreement and the European Union enlargement (Table 5). The scenarios vary along two dimensions. First, is the geographical dimension of the free trade agreement. The EU is always a part of the modelled FTA but its partners vary. We consider two major cases. The first assumes that Canada enters into an FTA with the EU. In a second case, the Applicants (i.e., the 13 candidate countries for accession to the EU) become members of the EU and Canada enters into an FTA with the enlarged EU.

The second dimension by which the scenarios differ has to do with the extent of liberalization of trade in the agricultural sector. Two potential developments are considered. In the first case, there is no liberalization of trade in agriculture. In this instance, the FTA covers all sectors except *Agriculture* and *Processed food* sectors – parties to the Agreement leave their tariffs and subsidies on agricultural products and foods at their initial levels. The second case involves the full liberalization of trade in *Agriculture, Processed food* as well as for the other eight sectors. This involves the removal of all tariffs on food imports and the elimination of all taxes and subsidies on food exports. For purposes of exposition, the two "agriculture" dimensions (i.e., no agriculture liberalization and complete liberalization in agriculture) are assigned the letters "a" and "b," respectively.

The scenarios differ in terms of the "shocks" applied. By this we mean that there are two sets of policy variables which are changed (or "shocked") over the course of this study: these are the bilateral import tariffs themselves and the export taxes and subsidies on food. Modelling a free trade agreement involves reducing bilateral tariff rates between FTA parties from their current level to zero, while preserving tariff rates with parties which are not involved in the FTA at the initial level. On the other hand, modelling trade liberalization in agriculture is a little more complex. It involves removal of all tariffs on agricultural imports and the elimination of taxes and subsidies on food exports.

TABLE 5 SUMMARY OF EXPERIMENTS		
#	Country/Region FTA	Agriculture
1a	Canada-EU	No liberalization of agriculture
1b	Canada-EU	Full liberalization of agriculture between Canada and the EU
2a	Canada-EU-Applicants	No liberalization of agriculture between Canada, the EU and the Applicants; "common market for agriculture" between the EU and the Applicants
2b	Canada-EU-Applicants	Full liberalization of agriculture between Canada, the EU, and the Applicants; "common market for agriculture" between the EU and the Applicants

The GTAP model permits us to assess the total effects of changes in policy variables on the welfare[22], or total economic gains, of the regions under study. This information is presented in Table 6. Changes in tariffs and subsidies affect the relative prices of exports and imports. This leads to changes in the volume of international trade and to the changes in the quantities of output. Therefore, the changes in welfare of regions come from two sources. First, there is an increase in the quantity of goods and services produced as the result of a better use of the available resources. And second, there is an improvement in the country's terms of trade, where terms of trade refer to the relative changes between prices at which a country's exports sell in foreign markets and prices at which a country's imports are purchased from abroad.

TOTAL WELFARE GAINS

Gains to Canada

Table 6 allows us to assess the impact of trade liberalization under the different scenarios. The key observation is that **Canada always benefits from an FTA with the European Union**. This conclusion holds independent of the geographic coverage of the FTA or the degree of the liberalization of trade in agriculture. The total benefit for Canada from Canada-EU FTA varies between $US 163 million and $US 236 million.

Canadian welfare suffers from EU enlargement in relative terms. However, these losses are rather moderate. The reduction in Canadian welfare between scenarios with and without the EU enlargement could range from $US 32 million to $US 25 million.

Finally, Canada benefits most from the complete openness of agricultural markets (scenarios "b"). Gains in Canadian welfare from the additional liberalization of the agricultural sector are between $US 40 million and $US 47 million.

TABLE 6 SUMMARY OF WELFARE CHANGES							
# Country/Region FTA	Agriculture	Canada	US	Mexico	EU	Applicants	ROW
			Value (millions of US dollars)				
1a Canada-EU	No	195.4	-504.2	-7.7	767.6	-19.8	-292.6
1b Canada-EU	Full	235.9	-561.7	-5.2	772.3	-19.2	-324.5
2a Canada-EU-Applicants	No	163.1	-884.3	-25.1	-292.8	3,664.5	-2,769.6
2b Canada-EU-Applicants	Full	210.8	-945.7	-22.4	-281.5	3,661.0	-2,801.0
			Per cent of GDP				
1a Canada-EU	No	0.0340	-0.0071	-0.0027	0.0093	-0.0043	-0.0025
1b Canada-EU	Full	0.0411	-0.0079	-0.0018	0.0094	-0.0041	-0.0028
2a Canada-EU-Applicants	No	0.0284	-0.0124	-0.0089	-0.0036	0.7877	-0.0238
2b Canada-EU-Applicants	Full	0.0367	-0.0133	-0.0080	-0.0034	0.7870	-0.0240

Gains to the European Union

Not surprisingly, **the European Union benefits from involvement in an FTA with Canada** in terms of economic welfare but suffers from losses when such an FTA is accompanied by the enlargement. This conclusion holds independent of the degree of liberalization of trade in agriculture. On a strictly bilateral basis, the total economic gains for the EU from a Canada-EU FTA are approximately $US 770 million. This is roughly three times greater than the total economic gain for Canada. (However, Canada's benefit is four times greater relative to GDP than is Europe's relative gain). While Canadian welfare would decline marginally with the EU enlargement, the EU would suffer a decline in welfare of $US 280 million to $US 290 million, suggesting that EU enlargement would likely result in over a $US 1 billion loss in welfare to the EU[23]. Therefore, the enlargement has much more profound implications for the EU. The EU losses from the enlargement arise because the Applicants trade with third countries becomes more liberalized upon the adoption of the EU tariff structure — the EU still maintains preferential access to the Applicant's market, however, their relative advantage is reduced. The EU marginally benefits from the full liberalization of trade in agriculture with Canada. The gains are between $US 5 million and $US 10 million.

Gains to the Applicant Countries

The Applicants would likely suffer slight welfare losses from a Canada-EU FTA if such an agreement were not accompanied by the EU enlargement. They are essentially unaffected by the degree of liberalization of trade in agricultural goods under Canada-EU FTA. This fact is explained by the small volume of trade between the Applicants and Canada. The Applicants benefit greatly by the EU enlargement. The magnitude of their absolute welfare gains (almost $US 3.7 billion) compares favourably with the EU losses.

Impacts on Other Regions

It is also important to assess the effects of a Canada-EU FTA on the United States, given the highly integrated nature of our markets. The United States would face a negative impact under any FTA scenario which involves either Canada or Canada and the Applicants with the European Union. Potential US welfare losses mount with the increase of the geographic coverage. US welfare would be reduced some $US 500 million as the result of a Canada-EU FTA and by $US 880 million where such an FTA is accompanied by the EU enlargement. As a general rule of thumb, agricultural trade liberalization would reduce US welfare by a further $US 60 million. Potential US losses are approximately twice as large as possible Canadian gains in the case of pure Canada-EU FTA. This is explained by the fact that the US loses preferential access to the Canadian market and Canada gains competitive advantage on the European market vis-à-vis the US. However, despite the magnitude of the welfare losses for the US, they represent only a tiny fraction of US GDP and, by themselves, are unlikely to induce any changes in the US trade policy.

A possible Canada-EU FTA would have very small impacts on the welfare of the rest of the world (ROW) and on Mexico. However, the ROW and Mexico suffer greater losses after EU enlargement. This is likely explained by trade diversion away from some traditional suppliers to the EU market toward new suppliers in the Applicant countries, which lessens Mexico's preferential access to EU markets.

CHANGES TO OUTPUT AND TRADE

Output

Our analysis now turns to the effects that the four scenarios have on Canadian output, imports, and exports. We point out that increases (or decreases) in output reflect only improvements in the allocative efficiency, or better use of factors of production such as capital, labour, and land, and not to gains in terms of trade, which is another component of welfare improvement. The pattern of changes in output differs from changes in welfare. That is to say, the expected output increases are lower when Canada is involved in the FTA with full liberalization of agriculture than without agricultural liberalization.

TABLE 7

CHANGES IN CANADIAN OUTPUT, IMPORT, AND EXPORT

#	Country/Region FTA	Agriculture	Output	Import	Export
			Value (millions of US dollars)		
1a	Canada-EU	No	108.0	1,949.4	1,557.3
1b	Canada-EU	Full	62.6	2,078.1	1,569.2
2a	Canada-EU-Applicants	No	111.0	1,955.3	1,691.0
2b	Canada-EU-Applicants	Full	65.4	2,093.0	1,703.6
			Per cent change		
1a	Canada-EU	No	0.0188	1.1264	0.7817
1b	Canada-EU	Full	0.0109	1.2007	0.7876
2a	Canada-EU-Applicants	No	0.0193	1.1298	0.8487
2b	Canada-EU-Applicants	Full	0.0114	1.2094	0.8551

The liberalization of agriculture has a different impact on output in comparison with the impact on welfare. When agricultural trade is completely liberalized, price advantages lead to an expansion of Canadian exports to European markets. Increasing exports causes an expansion of food production in Canada, and primary factors of production such as labour and capital are drawn from other sectors into food production. As a consequence, the full liberalization of trade in agriculture generates a decline of output in many manufacturing sectors in Canada (Table 8, from scenario 1a to 1b). Rising agricultural production combined with declines in manufacturing output leads to weaker growth in the total output (Table 7, from scenario 1a to 1b). This result reflects the fact that the allocative efficiency does not improve when resources are shifted toward the agriculture sector.

Changes in the volume of Canadian international trade do not vary significantly across scenarios. In both cases where Canada participates in an FTA with full liberalization of agriculture, Canadian imports are greater by approximately $US 140 million. However, the overall impact on total Canadian trade is modest, with exports expanding 0.8 per cent and imports increasing by at most 1.2 per cent. This is explained by the EU's relatively low share in Canadian trade. This result broadly confirms the earlier econometric results in the sense that the anticipated expansion of Canadian exports falls short of the expected rise in imports, and would likely cause the trade deficit to further deteriorate.

Exports and Imports

Trade liberalization with the EU has only a potentially modest impact on Canadian international trade. According to the model, Canadian two-way international trade will increase by roughly $US 3.6 billion (Table 7, scenario 2a). Imports would grow more than exports, and Canada's overall trade deficit would likely worsen. Interestingly enough, Canadian imports would be largely unaffected by the addition of the Applicant countries to a Canada-EU FTA. On the other hand, Canadian exports would expand by approximately $US 130 million should the Applicants join in a Canada-EU FTA (Table 7, from scenario 1a to 2a and from scenario 1b to 2b). The liberalization of agricultural trade also leads to an increase of Canadian imports of some $US 130 million (Table 10, from scenario 1a to 1b and from scenario 2a to 2b), offset by only marginal increases in Canadian exports.

For bilateral Canada-EU trade, Canadian exports to the EU would likely rise 11.2 per cent (or $2.4 billion) under complete tariff elimination, except for trade in agricultural and processed food products (Table C-1). At the same time, Canada would likely import some $7.1 billion more from the EU (or up 34.3 per cent).

Under tariff elimination including trade in agricultural and processed food products, Canadian exports to the EU would likely rise 15.6 per cent (or $3.4 billion), while exporting slightly less to other destinations. As well, Canada would likely import some $7.2 billion more from the EU (or 34.8 per cent), while importing less from other sources (Table C-2).

Though not shown in this study, trade liberalization with Canada would likely only have a modest impact on European international trade. According to the model, EU two-way international trade, excluding trade amongst members and with the Applicants, would likely rise from between $5.7 to $6.4 billion, depending on the degree of liberalization in agriculture. More specifically, EU external trade is expected to rise, with total exports increasing by $3.5 to $4.1 billion and total imports increasing by $4.9 to $5.4 billion, after excluding internal EU trade.

Sectoral Output

Table 8 considers how free trade agreements affect sectoral outputs in Canada. In general, with the exception of the *Processed food* sector, when Canada and the EU are involved in an FTA with full liberalization including agriculture (i.e., from scenario 1a to 2a and from scenario 1b to 2b), manufacturing output falls as primary factors of production shift to agriculture, for the reasons cited earlier.

Starting with the *Agriculture* and *Processed food* sectors, we note that their output would decline when agricultural trade is not liberalized and rises when it is liberalized.
The maximum increase for *Agriculture* is 0.65 per cent for a Canada-EU free trade agreement with the full trade liberalization in the agriculture sector (scenario 1b), while the maximum increase for *Processed food* is 0.51 per cent for a Canada-EU-Applicants free trade agreement with the full trade liberalization in the agriculture sector (scenario 2b).

Output in the *Mining, Textiles, Iron and steel, Chemicals* and *Services* sectors decline whenever Canada enters into any form of a free trade agreement with the EU. *Textiles* suffers the largest relative decline in output of all the sectors – output would be expected to fall nearly one per cent under free trade with the EU and inclusion of the Applicants would cause a further output decline of 0.28 per cent. *Mining* and *Chemicals* are the next two sectors with the largest negative impacts on output. However, in contrast with *Textiles*, the addition of the Applicants in the free trade agreement helps to lessen their expected declines in output. The declines in the output of the *Iron and steel* and *Services* sectors are expected to be small. For example, declines in services output never amount to more than one-twentieth of one per cent.

TABLE 8

CHANGES IN OUTPUT BY SECTOR IN CANADA, IN PER CENT

	Canada-EU		Canada-EU-Applicants	
Sectors	**1a**	**1b**	**2a**	**2b**
Agriculture	-0.19	0.65	-0.27	0.58
Mining	-0.27	-0.35	-0.26	-0.34
Processed food	-0.21	0.44	-0.19	0.51
Textiles	-0.85	-0.99	-1.13	-1.27
Iron and steel	-0.08	-0.26	-0.04	-0.23
Machinery and equipment	0.92	0.74	0.99	0.8
Transportation equipment	1.12	0.88	1.13	0.88
Chemicals	-0.21	-0.29	-0.18	-0.26
Other manufacturers	0.04	-0.23	0.07	-0.21
Services	-0.04	-0.04	-0.04	-0.05

A possible Canada-EU FTA would always have a positive impact on the *Machinery and equipment* and *Transportation equipment* sectors. Output in both sectors would likely rise by a minimum of three quarters of one per cent under any scenario. These sectors are positively affected by the EU enlargement but are negatively affected by the liberalization of agriculture.

Finally, we would like to point out that in many instances there are effects on agricultural output even when the sector is outside the scope of the free trade agreement scenario and agricultural tariffs are not changing (i.e., for scenarios "a"). The reason for this lies in the general equilibrium feedbacks in the model (Davies, 1998). As we have seen above, the expansion of output in certain manufacturing sectors as the result of trade liberalization draws inputs from agriculture, mining and other manufacturing sectors. Given that total quantities of capital, labour and land are fixed in the model, this, in effect, means that the expansion of agricultural output corresponds to a decline or to a reduced expansion in output of mining and manufacturing and vice versa.

Sectoral Exports and Imports

We now turn our focus to the effects of trade liberalization on trade itself. With five regions, ten sectors, and four scenarios for both imports and exports, the study yields a complex body of results. We remind the reader that the scenarios differ along a geographical dimension (where scenario "1" assumes only a Canada-EU FTA, while scenario "2" adds the Applicants to the first scenario) and an "agricultural liberalization" dimension (where scenario "a" represents no liberalization in agricultural trade and scenario "b" denotes complete liberalization in agricultural trade).

TABLE 9

EXPECTED GROWTH OF CANADIAN IMPORTS
(AVERAGES OVER ALL SCENARIOS EXCEPT AS INDICATED, IN PER CENT)

Sector	US	Mexico	EU	Applicants[1]	ROW	Total
Agriculture[2]	0.1 or 1.3	0.1 or 1.3	-0.5 or -14.5	*	0.1 or 1.4	0.1 or 0.6
Mining	-2.1	-2.2	31.5	-2.4 or -0.6	-2.3	1.3
Proc. food[2]	0.4 or -0.3	0.3 or -0.4	-0.2 or 9.9	**	0.3 or -0.4	0.3 or 1.4
Textiles[1]	-10.7 or -12.5	-10.9 or -12.5	153 or 149	-11 or 142	-11.0 or -12.7	5.6 or 6.3
Iron and steel	-2.8	-2.9	34.4	-3.1 or 14.3	-3	2
M&E	-1.9	-2	24.4	-2.2 or 5.3	-2.1	0.8
Transportation	-1.9	-2.2	61.7	-2.7 or 65.9	-2.4	1.1
Chemicals	-2.2	-2.3	22.7	-2.5 or 5.5	-2.4	1.1
Other mfg.	-2.1	-2.3	39	-2.4 or 66.8	-2.3	1.7
Services[1]	0.7	0.6	0.3 or -0.2	0.4 or -11.4	0.5	0.5
Total	-2	-2.2	34.1	-4.0 or 39.2	-2.7	1.2

1 Reported as scenario "1" or scenario "2".
2 Reported as scenario "a" or scenario "b".
* Scenario 1a: 0.0%; 1b: 1.3%; 2a: -16.3%; 2b: -19.6%
** Scenario 1a: 0.1%; 1b: -0.4%; 2a: -10.8%; 2b: 55.4%

Because of the great similarity in the CGE results across the four scenarios, we have chosen to present below summary tables of the likely impacts using the averages of the impacts from the four scenarios. In certain instances, we present two impacts. The exceptions are clearly delineated in the notes accompanying the tables. The complete results of all four scenarios are presented and discussed in technical Appendix C (see tables C.1 through C.4).

With respect to Canadian imports, the impacts are highly stable for all regions, except for the Applicants, for most manufactured goods (Table 9). In other words, the impacts do not differ by type "1" or "2" or "a" or "b" scenario. In the case of imports from the Applicants, as would be expected, the impacts generally differ between type "1" and type "2" scenarios, but not between type "a" or "b" scenarios – that is, they differ between the cases where the Applicants are excluded from or are part of the free trade agreement.

TABLE 10

EXPECTED GROWTH OF CANADIAN EXPORTS
(AVERAGES OVER ALL SCENARIOS EXCEPT AS INDICATED, IN PER CENT)

Sector	US	Mexico	EU	Applicants[1]	ROW	Total
Agriculture	-0.4 or -2.1	-0.5 or -2.3	-1.0 or 34.2	*	-0.4 or -2.2	-0.6 or 2.3
Mining	-0.3	-0.4 or -0.5	1.2	-0.2 or 7.4	-0.1 or -0.3	-0.1 or -0.2
Proc. food	-0.7 or -1.3	-0.8 or -1.4	-1.1 or 67.2	**	-0.7 or -1.3	-0.7 or 3.3
Textiles	1.9 or 1.6	1.7 or 1.4	64.6 or 58.3	1.9 or 45.4	2.0 or 1.6	5.7 or 5.4
Iron and steel	-0.3 or -0.5	-0.7 or -1.0	10.5 or 10.2	-0.2 or 10.7	-0.1 or -0.4	0.7 or 0.4
M&E	0.1 or -0.2	-0.1 or -0.3	25.5 or 25.2	0.2 or 41.6	0.1 or -0.1	2.1 or 1.8
Transportation	0.8 or 0.5	1.0 or 0.7	38.0 or 37.5	1.4 or 30.9	1.3 or 0.9	1.6 or 1.3
Chemicals	-0.1 or -0.3	-0.2 or -0.4	14.1 or 13.9	0.0 or 24.7	0.0 or -0.2	0.6 or 0.4
Other mfg.	-0.6 or -1.0	-0.8 or -1.3	10.4 or 9.8	-0.8 or 21.3	-0.6 or -1.1	0.6 or 0.2
Services	-0.9 or -1.1	-1.0 or -1.3	-0.1 or -0.7	-1.0 or 6.2	-0.8 or -1.1	-0.8 or -1.0
Total	0.0 or -0.3	-0.2 or -0.8	11.2 or 15.5	***	-0.3 or -0.8	0.9

1 This column reported as scenario "1" or scenario "2" only, all other entries by row are reported as scenario "a" or scenario "b".
* Scenario 1a: -0.3%; 1b: -2.2%; 2a: -35.5%; 2b: -14.8%
** Scenario 1a: -0.6%; 1b: -1.3%; 2a: 19.1%; 2b: 107.6%
*** Scenario 1a: 0.2%; 1b: -0.3%; 2a: 17.6%; 2b: 22.4%

Still on the imports side, there are a number of sectoral differences to note. For the case of *Textiles*, the impacts are stable for all regions but differ between scenarios "1" and "2", but not between scenarios "a" and "b". However, for *Processed food* and *Agriculture*, while the impacts are generally stable for all regions (except for the Applicants), the impacts differ between scenarios "a" and "b", but not between scenarios "1" and "2".

With respect to Canadian exports (Table 10), the impacts are highly stable for all regions for most manufactured goods in going from a Canada-EU FTA to an expanded FTA to include the Applicants, but differ from moving from an FTA that excluded agricultural liberalization to one that includes liberalization in the agriculture sector. That is, the impacts differ between scenarios "a" and "b" (but not between scenarios "1" and "2") and are reported on this basis above in Table 10. Again the exception is for the Applicants where, as would be expected, the impacts generally differ between type "1" and type "2" scenarios, but not between type "a" or "b" scenarios — that is, they differ between the cases where the Applicants are excluded from or are part of the free trade agreement.

Without liberalization in agricultural trade, there are generally moderate negative changes in the trade between Canada and the EU and the Applicants in *Agriculture* and *Processed food*. On the exports side, there are significant changes only when there is full liberalization of agricultural trade – Canadian *Agriculture* exports to the EU increase by nearly a third and *Processed food* exports increase by two-thirds, while *Processed food* exports to the Applicants more than double. However, there is a drop in *Agriculture* exports to the Applicants when they are part of an FTA with Canada. This is explained by the fact that Canada is assumed to remove export subsidies (e.g., freight subsidies for grain transportation) within the framework of trade liberalization in agricultural goods. For similar reasons, Canadian imports of *Agriculture* products from the EU decline by nearly 15 per cent and those from the Applicants fall by nearly 20 per cent, as both are also assumed to remove their export subsidies within this framework.

As a result of the decline in European and Applicant export subsidies, *Agriculture* imports from the other regions rise as their agricultural goods suddenly become relatively more competitive. However, with trade liberalization in agricultural products, Canadian imports of *Processed food* from the EU and the Applicants rise (by 10 and 55 per cent, respectively) at the expense of the other regions, who see their exports to Canada fall.

The situation for most other non-agricultural sectors, except for *Services*, is one of import substitution. Broadly speaking, free trade with the European Union would likely raise Canadian imports from the EU by some 20 to 30 per cent across most sectors, except for *Transportation equipment* (up some 60 per cent) and *Textiles* (up 150 per cent). Canadian imports from all other regions would fall moderately by some 2 to 3 per cent.

Adding the Applicants to a Canada-EU FTA does not significantly alter the results above. This is due to the fact that the Applicants hold an import market share of about only one-twentieth of one per cent. However, for the Applicants, they see substantial improvement in the growth of their exports to Canada (i.e., Canadian imports) as a result of joining a Canada-EU FTA – from negative growth to positive growth.

Although Canadian export gains would be made in most sectors, we note that some of the sectors report declines in output under the free trade scenarios presented in our analysis. This observation, for the most part, can be explained by the assumptions underlying the CGE model. In particular, increases in output in those sectors where Canada has a particular advantage is achieved through a shift of primary factors – land, labour, and capital – to these sectors and away from other sectors, thereby leading to the declines in output in these sectors.

We also note that, not surprisingly, an FTA with the EU leads to Canada-EU trade increases at the expense of Canada-US and Canada-Mexico trade. This "diversion" is due to a weakening of their preferential standing, as Canada's free trade partners expands to include the EU.

An FTA with Europe would likely result in strong growth in Canadian exports of *Textiles, Transportation equipment,* and *Machinery and equipment,* with more moderate export growth likely to occur in *Iron and steel, Chemicals,* and *Other manufacturers.* Overall, the trade-weighted average growth in exports is likely to be between 11 and 15 per cent – very much in line with the econometric estimate presented in Chapter III.

CONCLUDING REMARKS TO THE CGE ANALYSIS

The GTAP model has been used to simulate the effects of eliminating tariff barriers and export subsidies within the framework of a Canada-EU or Canada-EU-Applicants free trade agreement. However, the GTAP modelling framework and database have certain limitations which are important to keep in mind when interpreting the results. The results are what economists call *comparative static,* that is to say they provide an indication of how the regions in question and international trade flows would have looked like if, for example, the FTA between Canada and EU were in place in 1995 (Dee and Hanslow, 2000) as opposed to indicating the likely changes that would have occurred in the economy over 1995 to the present as result of a Canada-EU FTA or as a result of EU enlargement.

Indeed, many changes in the policy variables and economic indicators have already occurred. For example, the GTAP input/output tables for the Eastern European countries are based on World Bank data for 1989 – before their transition from centrally-planned to market-based economies. Undoubtedly, the structures of the Eastern European economies have changed profoundly over the interval. Moreover, since 1995, most of the Eastern European countries have concluded a number of preferential agreements with the EU, which have greatly reduced tariffs on their exports to the European Union. These developments are not captured by the model. However, the key developments, specifically the Mexico-EU FTA and the full implementation of NAFTA are captured in the modified data base.

Notwithstanding the above, it is possible to conclude that a Canada-EU FTA would have a positive impact on both parties to the Agreement. Canada's gain in welfare amounts to at least $US 200 million while that for the EU is approximately three times larger. However, relative to the size of their respective economies, the significance of a Canada-EU FTA is reversed, with expected Canadian gains roughly four times larger than European gains. Effects on Canadian output in the various sectors are quite small (i.e., less than one per cent in either direction) and are sensitive to whether trade in agricultural products is liberalized or not. There is significant bilateral growth of trade between Canada and the EU as the result of trade liberalization, particularly in manufactured goods. Lastly, Canada's trade deficit with the EU will likely widen as a result of a Canada-EU FTA.

EU enlargement has a moderate positive impact on Canadian output, and it substantially improves the trade balance situation over the bilateral Canada-EU FTA scenario.

V. CONCLUSIONS

THIS PAPER HAS FOCUSSED ON the quantitative economic implications for Canada of tariff elimination between Canada and the EU. We have accomplished this by first reviewing the actual recent patterns of trade and investment between Canada and the EU economies. We then modelled the bilateral trade flows between the two regions using regression analysis in order to examine the possible effects of an assumed tariff elimination between Canada and the European Union. Finally, we investigated the impacts of free trade under several different scenarios using a computable general equilibrium (CGE) model. The study offers the following facts and conclusions, more or less in the order in which they appear in the text.

First, Canada-EU trade is growing, but not as fast as Canada's trade with other regions around the globe. For this reason, the EU's importance as a trading partner, as measured by its share of Canada's total exports and total imports, has been declining at least over the past decade.

Second, there has been a considerable widening in the merchandise trade deficit with the EU over the 1990s. Moreover, both the econometric analysis and the CGE modelling point to a further likely increase in our trade deficit with the EU under any free trade scenario.

Third, the services trade deficit with the EU has narrowed over the middle- to late-1990s, although the trend seems to indicate that Canada will remain in a deficit position for some time. The services sector has not been addressed in our empirical analysis, so it is a matter of speculation as to whether a Canada-EU FTA will improve our services exports to the EU more than our services imports from the EU. We suggest the matter be referred for further study.

Fourth, the benefits of any tariff elimination between Canada and the EU will likely accrue to the central provinces of Ontario and Quebec and, to a lesser extent, British Columbia and Nova Scotia. The remaining provinces have limited exposure to trade with the EU.

Fifth, the empirical results suggest that EU exports to Canada will grow in the high-tech, high-value added sectors, especially *Transportation equipment*, and *Machinery and equipment*. These are the sectors that recorded the largest imports from the EU over the 1990s; these sectors also registered strong growth in imports from the EU over the decade. Imports from the EU would also likely increase strongly in *Mining* and *Textiles and apparel*. The increase in imports from the EU will displace to some extent imports from other regions. On the other hand, Canadian exports in the *Machinery and equipment*, and *Transportation equipment* sectors will likely increase strongly as well.

Sixth, *Agriculture* and *Processed food* would likely see a slight decline in their exports to the EU under tariff elimination, unless it is accompanied by a liberalization of agricultural trade, in which case Canadian exports of agri-food and agricultural products would likely grow substantially.

Seventh, our results suggest that a Canada-EU FTA would have a positive impact on both participants in the Agreement. Canada's gain in welfare amounts to at least $US 200 million, while that for the EU is approximately three times larger. However, when expressed in relative terms, the significance of a Canada-EU FTA is reversed, with expected Canadian gains roughly four times larger than European gains.

Eighth, the extension of a Canada-EU FTA to include the Applicants is moderately welfare-reducing for Canada, and slightly more so for the EU. However, when expressed as a percentage of GDP, the welfare reductions amount to only fractions of a per cent for both Canada and the EU.

Ninth, the total effects of tariff elimination with the EU on Canadian trade suggests that annual Canadian exports could increase by an order of magnitude of some $2.3 billion, while annual Canadian imports could rise by somewhere in the neighbourhood of $3.0 billion. Similarly, EU external trade is expected to rise, with total exports increasing by $3.5 to $4.1 billion, and total imports increasing by $4.9 to $5.4 billion, after excluding internal EU trade. When the analysis is extended to include the enlarged EU, we would likely see annual Canadian exports rise by $2.5 billion and annual Canadian imports rise by $3.0 billion.

And finally, Canadian exports to the EU would likely increase at least 11.2 per cent, or $2.4 billion, if tariffs were eliminated on all goods except agricultural and processed food products. If tariffs were also eliminated in these latter two sectors, Canada's exports to the EU would likely increase some 16 per cent, or $3.4 billion. Likewise, EU exports to Canada would likely rise by more than 34 per cent, or over $7 billion, with or without tariff elimination for agri-food products.

NOTES

1. Free trade agreements (FTAs) have also been negotiated with Israel and Chile and negotiations are underway with Costa Rica, Singapore, and the EFTA bloc.

2. Canada's Growing Economic Relations with the United States: Part 1 — What are the key dimensions?, *The Micro-Economic Monitor*, 2nd Quarter 1999, Industry Canada.

3. The next few paragraphs draw from the EU-Canada Bilateral Trade Relations Overview site at << http://europa.eu.int/comm/trade/bilateral/canada/canada.htm >>.

4. Throughout this study we use Europe/European and EU interchangeably.

5. More precisely, the agreement was between Canada and the European Economic Community and the European Atomic Energy Community.

6. See << http://www.europa.eu.int/abc-en.htm >>.

7. See << http://www.europa.eu.int/abc-en.htm >>.

8. These figures are EU and Canadian rates "against World, simple MFN applied", and are taken from the WTO PC Integrated Data Base "Tariffs and Imports" (Release 3, November 1999). We estimate the reduction for total Canadian imports from the EU to be 33.6 per cent, on a trade weighted basis, for the same period.

9. The 13 countries seeking to join the EU will be referred to as the Applicants or the Applicant countries for the remainder of this paper.

10. The Copenhagen criteria are the conditions set out at the European Council in Copenhagen in 1993 to become Member of the European Union. According to these criteria, membership requires that the candidate country:
    - Has achieved stability of institutions guaranteeing democracy, the rule of law, human rights, and respect for and protection of minorities;
    - The existence of a functioning market economy as well as the capacity to cope with competitive pressures and market forces within the Union; and
    - Has the ability to take on the obligations of membership, including adherence to the aims of political, economic and monetary Union.

11. See Cameron and Loukine (2001 forthcoming) for an examination of the economic implications for Canada of the proposed EU enlargement.

12. This review draws heavily on Hirshhorn (1997).

13. There has been an apparent surge in EU FDI inflows in 2000, led by Alcatel's purchase of Newbridge and Vivendi's acquisition of Seagrams.

14. This section is based Sancak (2000a), particularly the slides found on pages 26-28 of the report.

15. This section is based Sancak (2000b), particularly the slides found on pages 26-28 of the report.

16. For ease of presentation, the coefficients of the sectoral and country dummies are not reported here. See Appendix A for a detailed discussion of the model and the complete regression outputs.

17. Rao and Lemprière (1992) also note a significant downward trend in Canada's export penetration (i.e., the share of Canada's exports in the apparent demand) in the EC.

18. The trade-weighted average tariff imposed by the EU on Canadian exports stood at 4.28% in 1999.

19. For example, the study by Rao and Lemprière uses structural equations of international trade as a basis of their econometric model. They analyse linkages between Canadian productivity, costs, and trade. Unfortunately, due to very different nature of econometric technique employed in our work, it is difficult to compare results of two studies directly.

20. EU-Mexico Free Trade Agreement, available at
<< http://europa.eu.int/com/trade/bilateral/mexico/ftapr_en.htm >>.

21. It is assumed that GTAP database tariffs reflect remaining non-tariff barriers in *Agriculture* and *Processed food*.

22. In technical terms, welfare effects are measured by equivalent variation. Gains in welfare have two components: gains in allocative efficiency; and improvements in terms of trade. Gains in allocative efficiency arise from improvements associated with producing goods in which Canada has comparative advantage, while improvements in terms of trade mean that as a result of liberalization, Canadian exports become valued at higher prices in world markets, while Canadian imports can be purchased at lower prices.

23. Cameron and Loukine report a similar magnitude of loss of welfare to the EU arising from the enlargement.

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APPENDIX A
CANADA-EU NON-TARIFF BARRIERS

CANADIAN NON-TARIFF BARRIERS

THE EU has identified non-tariff barriers in some of the following areas:

Procurement

Procurement by provincial and municipal governments has not been opened to external competition under any agreement on procurement entered into by Canada. Discriminatory sub-federal procurement rules are in force. Moreover, at the federal level, there are exceptions for communications equipment, transportation equipment, shipbuilding and repair.

Agriculture

The EU is concerned with certain barriers such as the prohibition on imports of fresh fruit and vegetables without a pre-arranged buyer.

Wines and Spirits

The EU has a number of concerns about access to the Canadian wine and spirits market, including the protection of geographic designations such as Port, Bordeaux, Chablis and Amontillado and what it considers the discriminatory trading practices of Canadian provincial liquor boards.

Customs Valuation

The EU has expressed concern about the Canadian practice requiring that the purchaser in a sale for export to Canada must be located in Canada if the "transaction value" of the product is to be applicable for customs valuation purposes.

Maritime Services

The EU would like to see an end to the restrictions on coastal trade in Canada to Canadian flag vessels which extends to the transportation of cargo and passengers as well as all other commercial marine activities in Canadian waters. The import of foreign dredgers for coastal trade is forbidden.

Foreign Investment

The EU has expressed concern about remaining restrictions on foreign investment, including review requirements in certain cases and specific restrictions on inward direct investment in certain sectors. Canada's foreign bank branching legislation and provincial restrictions on foreign ownership of agricultural land are also of concern. While the former creates opportunities for foreign banks entering the Canadian market, mainly for commercial banking, the EU is concerned that the legislation provides only modest additional scope for retail banking, notably because of the restrictions on the ability of foreign bank branches to take deposits.

Glazed Ceramics and Glassware

The EU is concerned that Canada's proposal to amend the Hazardous Products Act and regulations with respect to glazed ceramics and glassware will impede the importation of these products to Canada.

Inter-provincial Barriers to Trade

The EU has observed that differing provincial practices, particularly with respect to standards and government procurement, have created significant barriers to inter-provincial trade and investment which have indirect effects internationally. Provincial liquor board practices are a case in point. Different processes and policies among provinces have significant impacts on production and trade in pharmaceuticals. Provincial inspection requirements limit inter-provincial trade. Labelling obligations for certain provinces, for example, differ from others. Restrictions regarding the colouring of margarine, and its blending with butter apply to inter-provincial trade. International and inter-provincial trade of bulk horticultural products is restricted under provincial regulation.

EUROPEAN NON-TARIFF BARRIERS

The Common Agricultural Policy and Subsidies on Agricultural Products

The CAP harms Canada's access to EU markets and affects its sales to third-country markets which must compete with subsidized exports from the EU. In March 1999, the EU heads of state approved Agenda 2000 EU Common Agriculture Policy (CAP) reform. While reform of any kind was welcome, Agenda 2000 resulted in only modest reductions to agriculture price supports and allowed direct production-linked subsidies to remain. As a result, the CAP continues to restrict access to the EU market for most Canadian agricultural products and continues to distort third-country markets.

Wine and Spirits

The EU requires that exports of wine from countries supplying more than 1,000 hectolitres per year be subject to certification of conformity with EU oenological (wine-making) practices. It also seeks an end to the use by foreign wineries of European-origin wine names, such as Champagne, Port, and Sherry. The EU also has concerns over certain provincial liquor board policies.

Genetically Modified Canola

The EU has yet to approve all of the varieties of genetically modified (GM) canola which Canada currently has in production. This has effectively prevented Canada from being able to export canola to the EU since 1997. The European Commission has taken a scientific approach on a case-by-case basis regarding genetically modified organisms (GMO) approvals. In fact, the Commission has released two favourable scientific reports, which state that two GM canola varieties already under cultivation in Canada do not pose health or environmental risks. Although the EC has taken a scientific approach to the GMO issue, this is not necessarily the case for all member states. Approvals are determined on the basis of a qualified majority vote. A blocking minority of Member States is in place which virtually assures the continuation of a de facto EU moratorium on further GMO approvals.

Bans and Restrictions on Certain Non-ferrous Metals

The European Commission has proposed a number of directives that provide, among other things, for restrictions and an eventual ban on the use of certain substances, including lead, mercury, and cadmium, of which Canada is an exporter. These substance bans if implemented in their present form, would have adverse trade implications for Canada with respect to both the non-ferrous metals in question and the manufactured products making use of them. Again, Canada considers that the bans are not proportional to any attendant risks and questions whether these measures are more trade restrictive than necessary to achieve the objectives of the directives.

Certification of Organic Food Products

The EU has detailed regulations on the production, labelling, and inspection of organic products and maintains a list of countries from which imports of organic products are permitted. Canada does not appear on this list. Until December 31, 2005, countries not on the list may still export organic products to the EU provided that the importer furnishes evidence that the imported products were produced in a manner equivalent to EU rules and inspected according to EU-equivalent measures. The case-by-case nature of this approval process creates uncertainty for Canadian exporters. After 2005, imports of organic products must originate in countries appearing on the EU list. Therefore, the Government of Canada, the organic industry, and other stakeholders are working to include Canada on the EU list.

Pinewood Nematode

Since July 1993, the European Union has required that Canadian exports of softwood lumber, except Western Red Cedar, be heat-treated in order to ensure the destruction of the pinewood nematode (PWN). This requirement has effectively eliminated Canadian exports of untreated softwood lumber to the European Union. Canada has indicated on numerous occasions that it views this mandatory requirement as excessive, given the negligible risk of establishment of pinewood nematode in the European Union as a result of trade in Canadian softwood lumber. Over the years, Canada has proposed alternative measures to control pinewood nematode, while allowing trade in untreated lumber. However, the European Union has not accepted Canadian proposals for less trade-restrictive measures. At Canada's request, WTO consultations

were held on July 15, 1998, but the issue remains unresolved. Government officials will work with industry and provincial representatives to assess next steps.

Hormone-treated Beef

In 1989, the European Union banned the use of growth-promoting hormones in livestock and imposed a ban on the importation of beef produced with growth-promoting hormones. Both Canada and the United States consistently opposed the ban on the grounds that it was not based on scientific evidence and was an unjustified barrier to trade. The safety of growth-promoting hormones has been endorsed by the Codex Alimentarius and by Canada's own scientific reviews. After Canada and the United States referred the matter to the World Trade Organization, a panel concluded in August 1997 that the EU ban violated the SPS Agreement since it could not be justified by scientific evidence. The panel's conclusion was further confirmed by the WTO Appellate Body in January 1998. The European Union was given until May 1999 to implement the WTO rulings, but it failed to do so. In August 1999, because the European Union did not implement the WTO rulings, and given the absence of an acceptable offer of compensation as an interim solution, Canada imposed retaliatory tariffs on a list of imports from the European Union, including beef, cucumbers, gherkins and pork. These measures will remain in effect until such time as the EU implements the WTO rulings or offers a satisfactory compensation package on an interim basis pending implementation of the WTO rulings.

Government Procurement

Canadian suppliers still do not have access to EU markets in a number of sectors, including telecommunications equipment and services, transportation equipment and electric utilities. Particular barriers that serve to restrict access include standards, certification, qualification and local-content requirements. Canada is addressing these issues with the European Union in the WTO Government Procurement Working Group to further reduce or eliminate tariff and non-tariff barriers.

APPENDIX B

ECONOMETRIC ANALYSIS OF CANADA-EU TRADE

INTRODUCTION

THE ECONOMETRIC MODEL that is used in this study is based on the "gravity model". The gravity model has long been the workhorse for empirical studies of the pattern of trade and is recognized for its consistently high explanatory power with regard to trade flows between countries.

The gravity model assumes that trade (attraction) flows depend on economic or geographic factors (distance) and the product of economic size (mass), similar to the gravity equation used in physics (Bayoumi and Eichengreen, 1997). Specifically, the volume of trade between two countries should increase with their real GDPs (the so-called gravity variable) and with *per capita* incomes, since large and rich countries should trade more than small and poor ones; and it should diminish as economic or geographic factors (such as distance) increase, since these factors tend to increase information, transportation, or transactions costs. Since the dependent variable in the gravity model is bilateral trade between pairs of countries, each variable (other than distance) is entered in product form.

The gravity model underwent severe criticism in the 1970s and 1980s for its lack of an economic theoretical base. Indeed, many protagonists used such models in an *ad hoc* fashion without theoretical justification of their approach. However, in the last decade, the model has significantly gained respect by many leading economists, for reasons pointed by Frankel (1997):

- gravity models have empirical success at predicting trade flows;
- improved theoretical foundations of gravity models, especially related to trade in imperfect substitutes; and,
- recent interest amongst economists in the relationship between geography and trade.

Early applications of gravity models were made by Tinbergen (1962) and Linneman (1966), who were the first to relate the intensity of trade to distance and the size of countries using more or less *ad hoc* specification. Theoretical economic foundations of the model were later developed by Leamer and Stern (1970), Anderson (1979), Bergstrand (1985, 1989 and 1990), Thursby and Thursby (1987), and Deardorff (1998).

The Linder (1961) hypothesis stated that countries with similar levels of per capita income should have similar preferences and similar but differentiated products, which would ultimately lead them to trade more with each other. Helpman (1987) and Helpman and Krugman (1989) showed that the intensity of trade between two partners depends positively on the product of both countries' GDP. According to this theory, consumers value diversity in the products they consume. That is, firms operate in an oligopolistic environment, and products are differentiated by firm and by country. Therefore, the sum of country *i* and country *j* GDP per capita should have a positive effect on the trade intensity. Helpman and Krugman (1989) thus argued that the similarity between partners in terms of GDP and growth rates invites greater trade flows between them. This conclusion contradicts the standard Hecksher-Olin trade theory which suggests that large differences in capital/labour ratios and GDP per capita should foster trade flows between trading partners.

More recently, several leading researchers have applied gravity models in their own tailor-made fashion. One of them, Krugman (1991a), used gravity models to explain economic geography where he stressed the role of transportation and transaction costs for trade flows between regional economies with increasing returns to scale. Moreover, Krugman (1991b) showed the importance of history in the determination of trade patterns within the gravity model framework.

Recent empirical applications by Gould (1994), Frankel, Stein and Wei (1998), Frankel and Rose (2000), Bayoumi and Eichengreen (1998), and Krueger (1999) have concentrated their research on regional trading blocs and their impacts on trade. Specific applications of gravity models using tariff data to explain intensity of trade include Thursby and Thursby (1987), Krueger (1999), and Tamirisa (1998).

MODEL SPECIFICATION

The estimation technique is Ordinary Least Squares (OLS) regression. To correct for associated heteroscedasticity, dummies for sectors were used and unique estimated regression intercept was dropped.[1] Using dummies for sectors make sense because of large differences between sectors in the scale and dynamic of trade. In addition, the regressions have been corrected for the presence of a first order autocorrelated disturbance term.

[1] See Judge and al., pp. 574-576 for further details.

Canadian exports $CanExp_{njt}$ in sector n to country j at year t are assumed to be defined by the following equations:[2]

$$\log CanExp_{njt} = \sum_{N=1}^{21} \varphi_0^N DUMSECT_N + \varphi_1 \log\left(CanPOP_t \cdot POP_{jt}\right) + \varphi_2 \log\left(\frac{CanGDP_t}{CanPOP_t} \cdot \frac{GDP_{jt}}{POP_{jt}}\right)$$
$$+ \varphi_3 \log(1 + TARIFF_{nt}) + \varphi_4 \log DIST_j + u_{njt};$$
$$u_{njt} = \rho u_{njt}^{-1} + \varepsilon_{njt}$$

where,

$DUMSECT_N$ are sectoral dummies;
$CanGDP_t$ is Canadian GDP at year t;
GDP_{jt} is the importing country GDP at year t;[3]
$CanPOP_t$ is Canadian population at year t;
POP_{jt} is the importing country population at year t;
$TARIFF_{nt}$ is trade-weighted tariff rate applied at sector n by the EU on exports from Canada at year t;
$DIST_j$ is distance between Canada and country j;
u_{njt} and u^{-1}_{njt} are disturbances in the original equation;
φ_0^N, φ_1, φ_2, φ_3, φ_4, ρ are parameters to be estimated; and
ε_{njt} is a log normally distributed error.

For the Canadian import regressions, additional data on Canadian tariffs for US goods were included. These additions reflect the exceptional role that the US plays in Canadian markets. None of the EU trade partners have a similarly large shares of the EU market. In all other respects, the import regressions are the same as the export regressions. Thus, Canadian imports $CanImp_{njt}$ in sector n to country j at year t are defined by the following equations:

$$\log CanImp_{njt} = \sum_{N=1}^{21} \varphi_0^N DUMSECT_N + \varphi_1 \log\left(CanPOP_t \cdot POP_{jt}\right) + \varphi_2 \log\left(\frac{CanGDP_t}{CanPOP_t} \cdot \frac{GDP_{jt}}{POP_{jt}}\right)$$
$$+ \varphi_3 \log(1 + TARIFF_{njt}) + \varphi_4 \log DIST_j + \varphi_5 \log(1 + TARIFFUS_{nt}) + u_{njt};$$
$$u_{njt} = \rho u_{njt}^{-1} + \varepsilon_{njt}$$

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[2] By expressing all values in log forms, we obtain direct elasticities of the dependent variable to the independent variables.

[3] Foreign countries GDP is measured in Canadian dollars using nominal exchange rate.

where,

$CanImp_{njt}$ is Canadian imports in sector n from country j at year t;
$TARIFFUS_{nt}$ are the Canadian tariffs applied to import from the US;
$TARIFF_{njt}$ is effective tariff rate applied at sector n by Canada on exports from EU member j at year t; *and*
$DUMSECT_N$, $CanGDP_t$, GDP_{jt}, $CanPOP_t$, POP_{jt}, $TARIFF_{njt}$, $DIST_j$, $LANG_j$, φ_0^N, φ_1, φ_2, φ_3, φ_4, φ_5, u_{njt}, u^{-1}_{njt} and ε_{njt} are essentially as defined above.

DATA

The data used in this analysis consists of time series on Canadian exports, Canadian imports, and duties collected in Canada between 1988 and 1999. These data are available for each of 15 EU countries for 21 HS sectors. In total there are 3,780 observations. Bilateral trade data were provided by Statistics Canada via its *World Trade Analyser* database. Because of several missing values for sectoral trade figures, especially for countries where the trade relationship with Canada is very small (e.g. Luxembourg, Denmark, etc.), observations with missing values have been excluded from the analysis.[4]

The data on GDP and population come from the International Monetary Fund's *International Financial Statistics*, May 2000 edition. Exchange rates are obtained from the OECD (1988-1997) and from the WEFA Group (1998, 1999), and are expressed as an annual average. Purchasing power parity exchange rates were also used in preliminary calculations conducted for this report. Results of regressions with nominal and PPP exchange rates were very close, however, use of nominal exchange rates produced a better fit of the regression consistently. Correspondingly, only GDP levels estimated at nominal exchange rates are used in this report.

Pre- and Post- Uruguay round EU tariff rates were obtained from the WTO and OECD tariff databases (Table B-1). Since the EU is a customs union, it is assumed that tariff rates applied to Canadian exports are the same across all EU countries[5]. Unfortunately, complete EU tariff data for all years was unavailable, so rates were approximated linearly for missing years. Canadian tariff rates were computed from Statistics Canada *World Trade Analyser* by dividing collected import duties by total import value (Table B-2).

Distances between Canada and European countries are calculated as the simple average of air distances between Vancouver, Calgary, Toronto, Ottawa, Montreal, Halifax and corresponding European capitals. Information on air distances was kindly provided by Air Canada.

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[4] See Frankel (1997) for more details on data exclusion.

[5] It is assumed that before 1995 Austria, Sweden and Finland applied the same tariffs to Canadian exports as EU countries.

TABLE B-1

TRADE-WEIGHTED TARIFF RATES ON IMPORTS FROM CANADA APPLIED BY THE EU (PER CENT)

Sector	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Live animals; animal products	9.64	12.01	14.39	16.77	19.14	21.52	23.90	26.27	28.65	25.75	22.82	19.91
Vegetable products	5.21	7.55	9.89	12.23	14.57	16.91	19.25	21.60	23.83	19.59	18.15	14.83
Animal/veg fats, oils and cleavage prod prepr edible fat; animal/vegetable waxes	0.30	1.31	2.31	3.32	4.32	5.33	6.34	7.34	7.29	9.51	8.80	10.04
Prepr foodstuffs; beverages, spirits and vinegar; tobacco and mfd tobacco subst	12.42	12.67	12.93	13.18	13.43	13.69	13.94	14.20	13.83	13.14	12.95	12.43
Mineral products	1.27	1.18	1.09	1.00	0.91	0.82	0.73	0.65	0.56	0.58	0.49	0.48
Products of the chemical or allied industries	5.50	5.37	5.23	5.10	4.96	4.83	4.70	4.56	4.40	4.20	3.92	3.70
Plastics and articles thereof; rubber and articles thereof	7.88	7.71	7.54	7.37	7.20	7.03	6.85	6.68	6.48	6.65	6.25	6.23
Raw hides and skins, leather, furskins; saddlery and harness; travel goods etc.	2.50	2.67	2.85	3.02	3.19	3.36	3.53	3.71	3.78	3.72	3.57	3.48
Wood and articles of wood; wood charcoal; cork; mfd of straw etc; basketware	2.00	2.04	2.07	2.11	2.15	2.18	2.22	2.25	2.13	1.87	1.74	1.52
Pulp of wood/fib cellulosic mat; waste, scrap of paper; paper and paperboard etc.	2.70	2.76	2.82	2.87	2.93	2.99	3.04	3.10	3.16	3.56	2.71	2.70
Textiles and textile articles	7.60	7.97	8.34	8.72	9.09	9.46	9.83	10.21	10.56	10.51	10.53	10.51
Footwear, headgear, umbrellas, ., pts; prepr feathers; arti flowers; human hair	11.10	10.95	10.80	10.64	10.49	10.34	10.19	10.04	9.88	9.90	9.50	9.38
Art of stone. plaster, cement, asbestos mica; ceramic prod; glass and glassware	8.14	7.84	7.55	7.26	6.96	6.67	6.37	6.08	5.78	5.79	5.39	5.26
Nat/cult pearls, prec/semi-prec stones and metals; imitation jewellery; coin	0.60	0.56	0.52	0.48	0.45	0.41	0.37	0.33	0.29	0.29	0.22	0.20
Base metals and articles of base metal	2.60	2.72	2.84	2.96	3.08	3.20	3.32	3.44	3.55	3.60	3.35	3.30
Mchy/mech appliances; elec equip; sound and television recorders/reproducers; pts	6.04	5.76	5.49	5.21	4.94	4.66	4.38	4.11	3.83	3.85	2.63	2.24
Vehicles, aircraft, vessels and associated transport equipment	7.30	7.14	6.98	6.82	6.66	6.50	6.34	6.18	6.03	6.20	6.40	6.59
Opt, photo, cine, meas, check, precis, med/surgical instru; clocks and watches	6.47	6.12	5.77	5.43	5.08	4.73	4.39	4.04	3.67	3.63	2.82	2.52
Arms and ammunition; parts and accessories thereof	5.70	5.40	5.11	4.81	4.52	4.22	3.93	3.63	3.33	3.11	2.97	2.77
Miscellaneous manufactured articles	6.31	6.04	5.76	5.49	5.22	4.95	4.68	4.41	4.13	4.06	3.34	3.05
Works of art, collectors' pieces and antiques	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agriculture and food (average)	7.80	9.83	12.10	14.06	15.77	17.24	19.08	20.98	22.46	19.51	17.95	15.47
Industrial goods (average)	3.30	3.17	3.18	3.29	3.33	3.51	3.26	3.39	3.36	3.28	2.93	2.97
Total average	3.96	3.96	4.20	4.41	4.70	5.17	5.53	5.67	5.50	5.23	4.68	4.28

Sources: 1988: GATT, Trade Policy Review, The European Communities, Vol 1, Geneva 1991: 265-287; 1996-98: IDB CD ROM trade-weighted tariffs; 1989-95, 1999: Authors' calculations.

TABLE B-2

TRADE-WEIGHTED TARIFF RATES ON IMPORTS FROM THE EU APPLIED BY CANADA (PER CENT)

Sector	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Live animals; animal products	1.48	1.45	1.29	1.30	1.15	1.00	0.76	0.71	0.65	0.64	0.46	0.52
Vegetable products	2.09	2.17	1.88	1.45	1.50	1.54	1.66	1.29	1.18	1.06	0.95	0.83
Animal/veg fats, oils and cleavage prod prepr edible fat; animal/vegetable waxes	2.57	2.10	2.04	1.43	1.79	1.05	1.87	0.62	0.56	0.62	0.33	0.61
Prepr foodstuffs; beverages, spirits and vinegar; tobacco and mfd tobacco subst	20.12	20.18	17.83	17.99	17.55	18.90	18.83	14.77	14.20	13.65	13.39	12.54
Mineral products	0.03	0.03	0.02	0.04	0.02	0.03	0.08	0.04	0.01	0.01	0.02	0.02
Products of the chemical or allied industries	5.72	5.66	5.97	6.15	6.45	6.49	6.11	2.16	1.69	1.58	1.44	1.33
Plastics and articles thereof; rubber and articles thereof	8.27	8.36	8.10	7.91	7.49	7.56	7.36	5.97	5.24	4.88	4.20	4.42
Raw hides and skins, leather, furskins; saddlery and harness; travel goods etc.	5.90	6.60	7.09	6.87	6.84	6.09	5.73	5.30	4.70	3.58	3.11	3.06
Wood and articles of wood; wood charcoal; cork; mfd of straw etc.; basketware	4.73	4.40	3.94	3.21	2.76	2.46	2.60	2.62	2.32	1.95	1.20	1.29
Pulp of wood/fib cellulosic mat; waste, scrap of paper; paper and paperboard etc.	3.62	3.44	3.07	2.85	2.80	2.74	2.80	2.16	1.42	1.26	0.62	0.48
Textiles and textile articles	17.12	17.14	17.93	17.34	17.10	16.52	15.53	14.69	13.80	12.75	12.37	12.04
Footwear, headgear, umbrellas, etc, pts; prepr. feathers; arti flowers; human hair	21.60	21.64	21.80	21.78	21.72	20.56	20.37	19.07	18.26	17.07	15.61	12.63
Art of stone. plaster, cement, asbestos mica; ceramic prod; glass and glassware	9.83	9.73	8.54	8.57	8.42	8.51	8.42	7.34	6.25	5.27	3.76	4.10
Nat/cult pearls, prec/semi-prec stones and metals; imitation jewellery; coin	3.16	3.11	3.13	4.03	4.31	4.05	4.08	3.99	3.19	1.73	1.60	1.87
Base metals and articles of base metal	6.46	6.60	6.32	6.38	6.17	5.76	5.56	4.68	4.09	3.60	2.79	2.50
Mchy/mech appliances; elec equip; sound and television recorders/reproducers; pts	3.01	2.96	3.01	2.80	2.78	2.54	2.24	1.71	1.13	0.89	0.47	0.43
Vehicles, aircraft, vessels and associated transport equipment	2.68	3.40	3.73	2.92	2.80	3.03	3.36	2.38	2.12	1.20	1.45	1.24
Opt, photo, cine, meas, check, precis, med/surgical instru; clocks and watches	1.99	2.08	1.92	1.80	1.70	1.61	1.28	0.88	0.63	0.53	0.34	0.36
Arms and ammunition; parts and accessories thereof	3.18	1.39	1.75	2.63	1.69	2.92	1.31	0.47	0.57	0.98	1.55	1.38
Miscellaneous manufactured articles	11.89	11.98	11.91	11.93	11.31	11.28	11.13	8.66	7.06	5.72	4.35	4.28
Works of art, collectors' pieces and antiques	1.60	1.65	1.67	1.90	2.28	1.94	1.92	1.40	1.72	0.50	0.02	0.09
Agriculture and food (average)	14.46	15.18	13.14	13.03	12.81	13.39	13.46	10.33	9.55	9.38	9.17	8.69
Industrial goods (average)	4.64	4.85	4.80	4.58	4.58	4.50	4.36	3.20	2.56	2.05	1.82	1.55
Total average	5.25	5.59	5.41	5.23	5.26	5.25	5.07	3.70	3.07	2.54	2.35	2.04

Source: Statistics Canada trade data, author's calculations

THE DETAILED REGRESSION RESULTS

Table B-3 presents a brief description of the variables. This is followed by tables B-4 to B-7 presenting the detailed regression results. The principal conclusions of these regressions are reported in the main body of the text of this study.

TABLE B-3

VARIABLES DEFINITIONS FOR REGRESSIONS

Variable	Definition
LEXPORTS	Export from Canada to EU members
LIMPTS	Import to Canada from EU members
LPNGDC	Product of Canadian GDP per capita and GDP of EU members in CAN$ at nominal exchange rate per capita
LPRODPOP	Product Canadian population and population of EU members
LADIS	Average air distance between six major Canadian cities and the capital of EU member
LTARIFUS	Canadian tariff applied to import from the US
LTARIFEU	EU tariff (single tariff coefficient)
LTAREU01 - LTAREU21	EU tariffs (various tariff coefficients for sectors)
LTARIFCA	Canadian tariff (single tariff coefficient)
LTARCA01 -- LTARCA21	Canadian tariffs (Various tariff coefficients for sectors)
DUM01 - DUM21	Dummies for 21 HS Sectors
AR(1)	Auto-regression coefficient

TABLE B-4

EXPORTS FROM CANADA TO THE EU (SINGLE TARIFF COEFFICIENT)

Dependent variable: LEXPORTS
Method: Least Squares
Sample(adjusted): 2→3780
Included observations: 3525
Excluded observations: 254 after adjusting endpoints
Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPNGDPC	0.476444	0.049860	9.555550	0.0000
LPRODPOP	1.148637	0.026563	43.24136	0.0000
LADIS	-4.459989	0.375435	-11.87954	0.0000
LTARIFEU	-3.356853	1.400162	-2.397475	0.0166
DUM01	37.65053	3.474896	10.83501	0.0000
DUM02	37.48004	3.473556	10.79011	0.0000
DUM03	33.03127	3.469482	9.520521	0.0000
DUM04	36.58400	3.470608	10.54109	0.0000
DUM05	37.80696	3.468937	10.89871	0.0000
DUM06	37.07440	3.468917	10.68760	0.0000
DUM07	36.31113	3.468706	10.46821	0.0000
DUM08	34.89148	3.470694	10.05317	0.0000
DUM09	37.37873	3.469988	10.77200	0.0000
DUM10	38.44912	3.468346	11.08572	0.0000
DUM11	36.19705	3.471062	10.42823	0.0000
DUM12	33.41253	3.474331	9.616968	0.0000
DUM13	35.02808	3.469379	10.09635	0.0000
DUM14	34.13654	3.474429	9.825079	0.0000
DUM15	37.62048	3.468451	10.84648	0.0000
DUM16	38.79270	3.468276	11.18501	0.0000
DUM17	38.02350	3.468511	10.96249	0.0000
DUM18	36.81078	3.468296	10.61351	0.0000
DUM19	33.12105	3.470178	9.544483	0.0000
DUM20	35.76037	3.469163	10.30807	0.0000
DUM21	36.55338	3.470168	10.53360	0.0000
AR(1)	0.717112	0.011903	60.24814	0.0000

R-squared	0.854464	Mean dependent var.	15.63597
Adjusted R-squared	0.853425	S.D. dependent var.	2.462834
S.E. of regression	0.942900	Akaike info criterion	2.727635
Sum squared resid.	3110.822	Schwarz criterion	2.773127
Log likelihood	-4781.457	Durbin-Watson stat.	2.047564
Inverted AR Roots	.72		

TABLE B-5

IMPORTS TO CANADA FROM THE EU (SINGLE TARIFF COEFFICIENT)

Dependent variable: LIMPTS
Method: Least Squares
Sample(adjusted): 2→3780
Included observations: 3591
Excluded observations: 188 after adjusting endpoints
Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPNGDPC	0.562464	0.061765	9.106464	0.0000
LPRODPOP	1.189144	0.028619	41.55066	0.0000
LADIS	-2.799948	0.380541	-7.357815	0.0000
LTARIFCA	-5.465837	0.536937	-10.17966	0.0000
LTARIFUS	8.582847	1.301928	6.592413	0.0000
DUM01	20.11560	3.663203	5.491260	0.0000
DUM02	19.92979	3.668151	5.433200	0.0000
DUM03	19.03924	3.678158	5.176297	0.0000
DUM04	22.98784	3.684465	6.239127	0.0000
DUM05	21.06443	3.662635	5.751168	0.0000
DUM06	22.26568	3.664999	6.075222	0.0000
DUM07	21.57351	3.669872	5.878546	0.0000
DUM08	20.09189	3.669096	5.475978	0.0000
DUM09	19.01036	3.665308	5.186566	0.0000
DUM10	21.24041	3.663553	5.797762	0.0000
DUM11	21.88347	3.683809	5.940447	0.0000
DUM12	20.07837	3.697392	5.430413	0.0000
DUM13	21.22631	3.668460	5.786165	0.0000
DUM14	19.53097	3.663904	5.330647	0.0000
DUM15	22.65941	3.666400	6.180288	0.0000
DUM16	23.66874	3.663340	6.460971	0.0000
DUM17	21.83908	3.660303	5.966468	0.0000
DUM18	21.56255	3.663302	5.886097	0.0000
DUM19	18.75839	3.668266	5.113695	0.0000
DUM20	21.37749	3.675423	5.816334	0.0000
DUM21	20.70350	3.668821	5.643095	0.0000
AR(1)	0.759490	0.010249	74.10116	0.0000

R-squared	0.850340	Mean dependent var.	16.06355
Adjusted R-squared	0.849248	S.D. dependent var.	2.391943
S.E. of regression	0.928714	Akaike info criterion	2.697459
Sum squared resid.	3073.984	Schwarz criterion	2.743971
Log likelihood	-4816.287	Durbin-Watson stat.	2.133490
Inverted AR Roots	.76		

TABLE B-6

EXPORTS FROM CANADA TO THE EU (VARYING TARIFF COEFFICIENT)

Dependent variable: LEXPORTS
Method: Least Squares
Sample(adjusted): 2→3780
Included observations: 3525
Excluded observations: 254 after adjusting endpoints
Convergence achieved after 9 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPNGDPC	0.661896	0.071692	9.232429	0.0000
LPRODPOP	1.164568	0.026561	43.84559	0.0000
LADIS	-4.308959	0.375770	-11.46702	0.0000
LTAREU01	-8.901803	2.422962	-3.673934	0.0002
LTAREU02	1.498557	2.288255	0.654891	0.5126
LTAREU03	-4.093348	5.187171	-0.789129	0.4301
LTAREU04	-0.372198	24.11907	-0.015432	0.9877
LTAREU05	193.6184	34.04396	5.687304	0.0000
LTAREU06	22.84147	15.71849	1.453159	0.1463
LTAREU07	27.42051	16.86041	1.626325	0.1040
LTAREU08	-165.8518	26.97000	-6.149490	0.0000
LTAREU09	57.24871	44.76664	1.278825	0.2010
LTAREU10	10.81690	29.17205	0.370797	0.7108
LTAREU11	-21.23109	10.12047	-2.097836	0.0360
LTAREU12	-41.66591	18.24100	-2.284190	0.0224
LTAREU13	-2.363924	9.965082	-0.237221	0.8125
LTAREU14	359.5100	84.44184	4.257487	0.0000
LTAREU15	-54.50928	34.03360	-1.601632	0.1093
LTAREU16	2.340118	7.230716	0.323636	0.7462
LTAREU17	2.266100	30.94397	0.073232	0.9416
LTAREU18	5.067658	7.100833	0.713671	0.4755
LTAREU19	-15.32942	11.36801	-1.348470	0.1776
LTAREU20	-20.40325	8.659631	-2.356135	0.0185
DUM01	33.53386	3.725199	9.001896	0.0000
DUM02	31.70382	3.731124	8.497122	0.0000
DUM03	27.94312	3.749768	7.451960	0.0000
DUM04	31.14552	4.736184	6.576078	0.0000
DUM05	31.07699	3.811932	8.152555	0.0000
DUM06	30.73542	3.935347	7.810091	0.0000
DUM07	29.15958	4.091784	7.126374	0.0000
DUM08	35.00281	3.755911	9.319394	0.0000
DUM09	31.04850	3.949554	7.861268	0.0000
DUM10	32.92535	3.854641	8.541742	0.0000
DUM11	32.67615	3.740855	8.734941	0.0000
DUM12	32.03151	4.368706	7.332034	0.0000
DUM13	29.90325	3.910898	7.646134	0.0000
DUM14	27.68257	3.800833	7.283291	0.0000
DUM15	34.06125	3.759596	9.059817	0.0000
DUM16	33.42759	3.817649	8.756066	0.0000
DUM17	32.54858	4.474098	7.274892	0.0000
DUM18	31.30987	3.819975	8.196353	0.0000
DUM19	28.42583	3.838275	7.405886	0.0000
DUM20	31.45379	3.844651	8.181181	0.0000
DUM21	31.45932	3.760534	8.365654	0.0000
AR(1)	0.720685	0.011879	60.66929	0.0000

R-squared	0.859203	Mean dependent var.	15.63597
Adjusted R-squared	0.857422	S.D. dependent var.	2.462834
S.E. of regression	0.929953	Akaike info criterion	2.705317
Sum squared resid.	3009.545	Schwarz criterion	2.784053
Log likelihood	-4723.122	Durbin-Watson stat.	2.060341
Inverted AR Roots	.72		

TABLE B-7

IMPORTS TO CANADA FROM THE EU (VARIABLE TARIFF COEFFICIENTS)

Dependent variable: LIMPTS
Method: Least Squares
Sample(adjusted): 2→3780
Included observations: 3591
Excluded observations: 188 after adjusting endpoints
Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPNGDPC	0.385326	0.061120	6.304387	0.0000
LPRODPOP	1.174536	0.027362	42.92518	0.0000
LADIS	-2.545981	0.365253	-6.970464	0.0000
LTARCA01	1.148540	6.152423	0.186681	0.8519
LTARCA02	-4.716075	2.866952	-1.644979	0.1001
LTARCA03	-6.198890	2.429705	-2.551294	0.0108
LTARCA04	-0.859483	0.647525	-1.327336	0.1845
LTARCA05	-45.09589	3.248833	-13.88064	0.0000
LTARCA06	-5.281463	2.979614	-1.772532	0.0764
LTARCA07	-10.74232	3.741469	-2.871151	0.0041
LTARCA08	0.948941	3.221284	0.294585	0.7683
LTARCA09	-16.94710	3.698895	-4.581665	0.0000
LTARCA10	15.94606	5.398557	2.953762	0.0032
LTARCA11	-0.468671	2.974271	-0.157575	0.8748
LTARCA12	1.982499	2.727562	0.726839	0.4674
LTARCA13	-3.308303	3.131889	-1.056328	0.2909
LTARCA14	-23.56953	2.487460	-9.475341	0.0000
LTARCA15	-2.107043	5.216868	-0.403890	0.6863
LTARCA16	-19.86018	6.049455	-3.282970	0.0010
LTARCA17	-19.73015	3.181521	-6.201483	0.0000
LTARCA18	-39.63108	3.707919	-10.68823	0.0000
LTARCA19	-36.55939	3.315045	-11.02832	0.0000
LTARCA20	-1.147031	2.719492	-0.421782	0.6732
LTARCA21	-7.740061	2.840364	-2.725024	0.0065
LTARIFUS	4.871210	1.391593	3.500456	0.0005
DUM01	21.64197	3.539554	6.114322	0.0000
DUM02	21.49181	3.545638	6.061480	0.0000
DUM03	20.72429	3.553684	5.831777	0.0000
DUM04	23.80624	3.559421	6.688233	0.0000
DUM05	23.11825	3.537071	6.535987	0.0000
DUM06	23.89373	3.543284	6.743384	0.0000
DUM07	23.62139	3.549600	6.654663	0.0000
DUM08	21.37993	3.552590	6.018126	0.0000
DUM09	21.11937	3.553256	5.943667	0.0000
DUM10	22.32946	3.544204	6.300275	0.0000
DUM11	22.96169	3.533263	6.498721	0.0000
DUM12	20.80342	3.561810	5.840688	0.0000
DUM13	22.66376	3.564340	6.358473	0.0000
DUM14	22.09373	3.535229	6.249588	0.0000
DUM15	24.18063	3.560038	6.792239	0.0000
DUM16	25.56994	3.545220	7.212513	0.0000
DUM17	23.55695	3.535529	6.662921	0.0000
DUM18	23.65446	3.538675	6.684553	0.0000
DUM19	21.31161	3.543815	6.013748	0.0000
DUM20	22.77431	3.555599	6.405196	0.0000
DUM21	22.36184	3.546075	6.306082	0.0000
AR(1)	0.774596	0.010140	76.38968	0.0000

R-squared	0.868575	Mean dependent var.	16.06355
Adjusted R-squared	0.866869	S.D. dependent var.	2.391943
S.E. of regression	0.872750	Akaike info criterion	2.578667
Sum squared resid.	2699.440	Schwarz criterion	2.659634
Log likelihood	-4582.997	Durbin-Watson stat.	2.126522
Inverted AR Roots	.77		

The Sectoral Level Results

The main body of the text presents and discusses the overall or aggregate effects. However, total effects sometimes mask significant changes in the underlying components, particularly when examining the impacts of tariff reductions at the sectoral level. In this section, we briefly examine Canada's exports to the EU at the sectoral level.

The sectoral regression results on the exports side are reported in Table B-8. We note that half of tariff coefficients have negative signs corroborating our expectations that further tariff reductions by the EU could mean higher exports for Canada – this is especially true for most of the major finished and semi-finished product categories, such as textiles, footwear and leathers, base metals and their products, and miscellaneous manufacturing articles. Also of particular interest is the observation that the coefficients of all of the key variables – the product of Canadian and European GDP levels, the product of Canadian and European population, and the distance between Canada and European countries – have risen.

Not surprisingly, our uniform approach also generates a number of estimates that show the presence of a positive relationship between EU tariffs and Canadian exports. This observation is not unique to our study, as was discussed briefly in the main body of this study. There are a number of possible explanations for these observations. First, it is possible that, for specific countries/sectors, trade intensity diminished at the same time as tariff rates dropped over the 1988-1999 period. Second, for some sectors, tariffs were already at very low level in 1988 and did not change significantly over the study period. This quite possibly explains why abnormally high values were obtained for *Mineral products* and *Pearls, precious and semi-precious stones and metals*. Finally, the presence of non-tariff barriers also could affect the regression results.

TABLE B-8

EXPORTS FROM CANADA TO THE EU (VARYING TARIFF COEFFICIENTS)

Variable	Coefficient	t-Statistic
Product of GDP per capita*	0.662	9.232
Product of population*	1.165	43.846
Distance*	-4.309	-11.467
EU Tariffs on:		
Live animals; animal products*	-8.902	-3.674
Vegetable products	– –	– –
Animal/veg fats, oils and waxes; prepared edible fats, etc.	-4.093	-0.789
Prepared foodstuffs; beverages, spirits, tobacco and products	-0.372	-0.015
Mineral products	– –	– –
Products of the chemical or allied industries	– –	– –
Plastics and articles thereof; rubber and articles thereof	– –	– –
Raw hides/skins, leather, furs; saddlery and travel goods etc.*	-165.852	-6.149
Wood and articles of wood; wood charcoal; cork etc.	– –	– –
Pulp of wood/fib cellulosic mat; paper and paperboard etc.	– –	– –
Textiles and textile articles*	-21.231	-2.098
Footwear, headgear, umbrellas, pts; prepr feathers; etc.*	-41.666	-2.284
Art of stone, plaster, cement; ceramic prod; glass/glassware	-2.364	-0.237
Pearls, prec/semi-prec stones/metals; imit. jewellery; coin	– –	– –
Base metals and articles of base metal**	-54.509	-1.602
Machinery/mechanical appliances; electrical equip; etc.	– –	– –
Vehicles, aircraft, vessels and associated transport equipment	– –	– –
Opt, photo, meas, precis, med/surgical instrmnts, clocks etc.	– –	– –
Arms and ammunition; parts and accessories thereof**	-15.329	-1.348
Miscellaneous manufactured articles*	-20.403	-2.356

* Significant at 95% significance level
** Significant at 80% significance level

Given the above sectoral estimates, it is now possible to estimate the potential impact of tariff elimination for the various sectors. In keeping with the standard practice, we assume that those sectors with positive coefficients have no impact on Canadian exports (e.g., Létourneau and Lester). The two columns to the far right of the table B-9 show the potential impact on Canadian exports to the EU – they are generated from the data showing the tariff elasticities, the tariff rates, and the actual exports. The second-from-the-far-right column shows the effect for all sectors where tariff elasticities were found to be negative (i.e. with negative regression coefficients), while the far right column reports the same numbers only for sectors where these coefficients are significant at the 95 per cent significance level.

TABLE B-9

IMPACT OF TARIFF ELIMINATION ON CANADIAN EXPORTS TO THE EU

Sector	Regress Coefficient	1999 Tariff Rate (%)	1999 Exports $ millions	Export Increase $ millions (all)	Export Increase $ millions (signif.)
Live animals; animal products	-8.9	19.91	389	689	689
Vegetable products	– –	14.83	855	0	0
Animal/veg fats, oils and waxes; prepared edible fats, etc.	-4.1	10.04	32	13	0
Prepared foodstuffs; beverages, spirits, tobacco and products	-0.4	12.43	334	15	0
Mineral products	– –	0.48	1,471	0	0
Products of the chemical or allied industries	– –	3.7	842	0	0
Plastics and articles thereof; rubber and articles thereof	– –	6.23	248	0	0
Raw hides/skins, leather, furs; saddlery and travel goods etc.	-165.9	3.48	52	300	300
Wood and articles of wood; wood charcoal; cork etc.	– –	1.52	702	0	0
Pulp of wood/fib cellulosic mat; paper and paperboard etc.	– –	2.7	2,403	0	0
Textiles and textile articles	-21.2	10.51	188	419	419
Footwear, headgear, umbrellas, pts; prepr feathers; etc.	-41.7	9.38	19	74	74
Art of stone, plaster, cement; ceramic prod; glass/glassware	-2.4	5.26	76	9	0
Pearls, prec/semi-prec stones/metals; imit. jewellery; coin	– –	0.2	52	0	0
Base metals and articles of base metal	-54.5	3.3	1,321	2,376	0
Machinery/mechanical appliances; electrical equip; etc.	– –	2.24	3,120	0	0
Vehicles, aircraft, vessels and associated transport equipment	– –	6.59	2,108	0	0
Opt, photo, meas, precis, med/surgical instrmnts, clocks etc.	– –	2.52	540	0	0
Arms and ammunition; parts and accessories thereof	-15.3	2.77	29	12	0
Miscellaneous manufactured articles	-20.4	3.05	232	144	144
Works of art, collectors' pieces and antiques	– –	0	862	0	0
Total		4.28	15,875	4,054	1,628

Thus complete tariff elimination on Canadian exports to the EU would likely increase our exports to this region somewhere in the range from $1.6 billion to $4.1 billion, or between 10.1 per cent and 25.8 per cent of the $15.9 billion exported in 1999. This range comfortably encircles the $2.3 billion aggregate point estimate provided in Chapter III.

Looking at the second-to-last column, a number of sectors are not reproduced in the final column. The impacts of tariff elimination with Europe for these sectors range from an additional $12 million in exports for *Arms and ammunition and parts and accessories thereof* to further exports of $2.4 billion for *Base metals and articles of base metals*. For these sectors, the regression coefficients were found to be significant only at 80 per cent significance level, i.e. there is approximately 20 per cent chance that trade liberalization will have no impact in this sectors. These figures represent a potential further $2.4 billion in Canadian exports to the EU.

Turning now to the detailed import regression results. The reader will note that the signs for the estimated coefficients for the *Product of per capita GDP, Product of population, Distance* and *Canadian tariffs applied to the US* have not changed from the aggregate import estimation results; however, there are reductions in the magnitude of the GDP per capita variable and the Canadian tariffs applied to the US variable between the two regressions. Our comment will focus on tariffs applied to US goods variable. The reduction in magnitude of this variable suggests that at the sectoral level other factors become more relevant to the purchasing decision. Long-standing supplier relations, quality, and ability to meet technical specifications are examples of factors that are likely relevant here.

Table B-10 shows that Canadian imports could substantially increase for *Mineral products, Plastics and rubber, Precious and semi-precious stones and metals, Machinery, mechanical appliances, electrical equipment etc.*, and *Vehicles, aircraft, vessels and associated transport equipment*. The majority of the sectoral tariff coefficients have the correct (negative) signs and they are statistically significant[6]. Most likely, this is a result of better data available to us on Canadian tariffs than on the export side. Of particular note is the fact that the results show only moderate impacts from tariff elimination on agricultural products. This can probably be explained by the presence of significant non-tariff barriers in these sector.

It is now possible to set out the impact of tariff elimination on Canadian imports in the various sectors. As was the case for exports, it is assumed that the elimination of tariffs in sectors with positive coefficients will not have any impact on Canadian imports. The last two columns of Table B-11 show the possible increases in Canadian imports from the EU. As noted previously, the second-from-the-right column shows the effect for all sectors where tariff elasticities were found to be negative (i.e. with negative regression coefficients), while the far right column reports the same numbers only for those sectors where these coefficients are significant at the 95 per cent significance level.

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[6] Létourneau and Lester (1988) have estimated that price elasticities for Canadian import that are much smaller than is suggested by our estimations with regard to tariffs applied on European goods.

TABLE B-10

IMPORTS INTO CANADA FROM THE EU (VARYING TARIFF COEFFICIENTS)

Variable	Coefficient	t-Statistic
Product of GDP per capita*	0.385	6.304
Product of population*	1.175	42.925
Distance*	-2.546	-6.970
Canadian tariffs applied to the US*	4.871	3.500
Canadian Tariffs on:		
Live animals; animal products	– –	– –
Vegetable products**	-4.716	-1.645
Animal/veg fats, oils and waxes; prepared edible fats, etc.*	-6.199	-2.551
Prepared foodstuffs; beverages, spirits, tobacco and products**	-0.859	-1.327
Mineral products*	-45.096	-13.881
Products of the chemical or allied industries**	-5.281	-1.773
Plastics and articles thereof; rubber and articles thereof*	-10.742	-2.871
Raw hides/skins, leather, furs; saddlery and travel goods etc.	– –	– –
Wood and articles of wood; wood charcoal; cork etc.*	-16.947	-4.582
Pulp of wood/fib cellulosic mat; paper and paperboard etc.	– –	– –
Textiles and textile articles	-0.469	-0.158
Footwear, headgear, umbrellas, pts; prepr feathers; etc.	– –	– –
Art of stone, plaster, cement; ceramic prod; glass/glassware	-3.308	-1.056
Pearls, prec/semi-prec stones/metals; imit. jewellery; coin*	-23.570	-9.475
Base metals and articles of base metal	-2.107	-0.404
Machinery/mechanical appliances; electrical equip; etc.*	-19.860	-3.283
Vehicles, aircraft, vessels and associated transport equipment*	-19.730	-6.201
Opt, photo, meas, precis, med/surgical instrmnts, clocks etc.*	-39.631	-10.688
Arms and ammunition; parts and accessories thereof*	-36.559	-11.028
Miscellaneous manufactured articles	-1.147	-0.422
Works of art, collectors' pieces and antiques*	-7.740	-2.725

* Significant at 95% significance level
** Significant at 80% significance level

TABLE B-11

IMPACT OF TARIFF ELIMINATION ON CANADIAN IMPORTS FROM THE EU

Sector	Regress Coefficient	1999 Tariff Rate (%)	1999 Imports $ millions	Import Increase $ millions (all)	Import Increase $ millions (signif.)
Live animals; animal products	– –	0.52	280	0	0
Vegetable products	-4.716	0.83	361	14	0
Animal/veg fats, oils and waxes; prepared edible fats, etc.	-6.199	0.61	74	3	3
Prepared foodstuffs; beverages, spirits, tobacco and products	-0.859	12.54	1,486	160	0
Mineral products	-45.096	0.02	2,102	19	19
Products of the chemical or allied industries	-5.281	1.33	3,864	271	0
Plastics and articles thereof; rubber and articles thereof	-10.742	4.42	845	401	401
Raw hides/skins, leather, furs; saddlery and travel goods etc.	– –	3.06	248	0	0
Wood and articles of wood; wood charcoal; cork etc.	-16.947	1.29	121	26	26
Pulp of wood/fib cellulosic mat; paper and paperboard etc.	– –	0.48	836	0	0
Textiles and textile articles	-0.469	12.04	833	47	0
Footwear, headgear, umbrellas, pts; prepr feathers; etc.	– –	12.63	342	0	0
Art of stone, plaster, cement; ceramic prod; glass/glassware	-3.308	4.1	593	80	0
Pearls, prec/semi-prec stones/metals; imit. jewellery; coin	-23.57	1.87	232	102	102
Base metals and articles of base metal	-2.107	2.5	2,064	109	0
Machinery/mechanical appliances; electrical equip; etc.	-19.86	0.43	10,245	875	875
Vehicles, aircraft, vessels and associated transport equipment	-19.73	1.24	4,996	1,222	1,222
Opt, photo, meas, precis, med/surgical instrmnts, clocks etc.	-39.631	0.36	1,307	186	186
Arms and ammunition; parts and accessories thereof	-36.559	1.38	59	30	30
Miscellaneous manufactured articles	-1.147	4.28	547	27	0
Works of art, collectors' pieces and antiques	-7.74	0.09	473	3	3
Total			31,908	3,575	2,867

Complete tariff elimination would likely lead to a significant increase in the absolute volume of imports. As the result of tariff elimination, Canadian imports from the EU could be expected to increase somewhere from $2.9 billion to $3.6 billion, or from between 9.0 per cent to 11.2 per cent above 1999 levels. Quite possibly, these imports could be in the form of cheaper intermediate products which could help improve the competitiveness of Canadian firms and lead to job creation. And, again, the aggregate estimate falls quite nicely into the range provided by the sectoral approach.

The biggest dollar value impact of tariff elimination falls in the two sectors that are responsible for about one-half of total Canadian imports from the EU – *Machinery, mechanical appliances, electrical equipment etc.* and *Vehicles, aircraft, vessels and associated transport equipment*. While Canadian tariffs in these sectors are already quite low, these two sectors are quite sensitive to changes in tariffs. The estimates suggest that a one per cent reduction in tariffs in these sectors will lead to a roughly twenty per cent increase in M&E and transportation equipment imports. Together, the two sectors account for roughly 60 per cent of total impact of the tariff elimination exercise. Moreover, both estimates are significant.

APPENDIX C

COMPUTABLE GENERAL EQUILIBRIUM (CGE) ANALYSIS OF CANADA-EU TRADE LIBERALIZATION

A BRIEF OVERVIEW OF THE CGE MODEL

AN AGGREGATED VERSION OF THE GLOBAL TRADE ANALYSIS PROJECT (GTAP) model is used for this report. The standard GTAP model is a multi-region, computable general equilibrium model, with perfect competition and constant returns to scale. Certain macroeconomic variables such as exchange rates or inflation are not considered in the standard model. Bilateral trade is handled via the Armington assumption meaning that similar goods from various countries are treated as different goods in the domestic market. Other distinguishing features of the model include: explicit treatment of international trade and transport margins, a global banking sector which intermediates between global savings and consumption, and the treatment of private household preferences using the non-homothetic constant difference in elasticities (CDE) functional form (Hertel, 1997).

Figure 1 offers a simplified overview of economic activity in the GTAP model. Arrows represent the direction of monetary flows. Atop this figure is the regional household; this household receives income from the sale of primary factors such as land, labour, and capital to firms and allocates expenditures across three categories – private, government and savings expenditures. Producers combine intermediate inputs from domestic and foreign sources in order to produce goods and services. Their output is purchased by other firms, domestic private households, and government, and part of their output is exported to the rest of the world. Private households purchase consumer goods from both domestic and foreign sources, as does government. Savings is a particular form of household expenditures, and are accumulated in a global bank and distributed as investments to producers. The rest of the world consists of a region with the same structure as the domestic region.

Figure 2 provides a visual representation of the production structure for firms in each sector in the model. At the bottom of the inverted tree are individual inputs demanded by the firms. Primary factors of production are combined with intermediate inputs under an assumption of zero elasticity of substitution between them. Within the primary inputs branch of the production tree, substitution is governed by a Constant Elasticity of Substitution (CES) production function. The values of the elasticities of substitution used in the GTAP model are shown in Table C-11. Within the intermediate inputs branch of the production tree, imported intermediate inputs are assumed to be separable from domestically produced intermediate inputs. This separability is also governed by a CES production function. Finally, foreign produced inputs can be sourced from different regions of the world, hence the dashed line between the firms' production tree and the CES "nest" (i.e., that part of the tree below the dashed line) combining foreign inputs. Specific values for the elasticities of substitution between domestic and foreign intermediate inputs and among the foreign intermediate inputs are also shown in Table C-11.

FIGURE 1

STRUCTURE OF GTAP [ADOPTED FROM HERTEL (1997)]

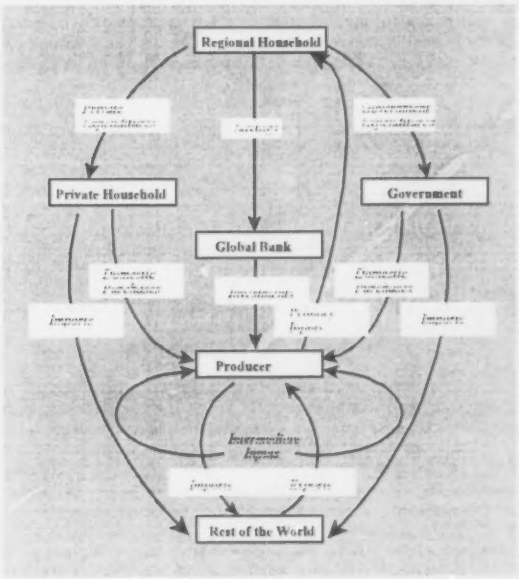
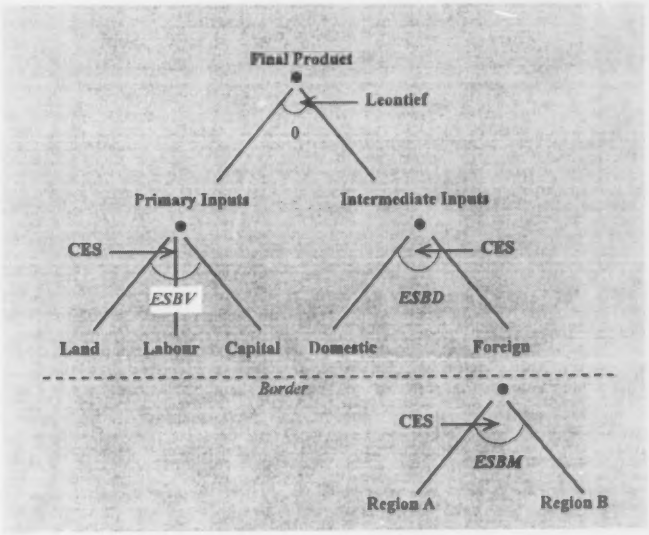


FIGURE 2

GTAP PRODUCTION STRUCTURE [ADOPTED FROM HERTEL (1997)]



At the heart of the GTAP lies a large database containing detailed bilateral trade, as well as transport and protection data characterizing economic relations among some 45 regions. The international trade data are linked with individual country input-output tables to account for inter-sectoral linkages among some 50 sectors within each region. The data are in millions of US dollars and the reference year for the model is 1995. However, as noted and discussed in Chapter IV, we have made certain database modifications to account for a number of important policy developments that have taken place since 1995, most especially to take into account the policy measures implemented under the NAFTA and the Mexico-EU Free Trade Agreement.

To focus the analysis and keep the volume of results manageable, the Database was aggregated into six regions and ten sectors. The choice of the regional and sectoral aggregates are defined by the purpose of this study. Some GTAP regions such as Canada, US, Mexico correspond to individual countries, while others, such as European Union[1], the EU-Applicants[2] (or "Applicants"), and the rest of the world (ROW) represent an aggregation of countries. Also of note with respect to the Applicants, the GTAP database does not allow us to include all of the candidates for EU expansion into our research.[3]

For the sectoral breakdown, we use a ten-sector industrial aggregation — *Agriculture, Mining, Processed food, Textiles and apparel, Iron and steel, Machinery and equipment, Transportation equipment, Chemicals, rubber and plastics, Other manufacturers,* and *Services* — to investigate the broader impacts of a Canada-EU free trade agreement, as well as the implications of EU enlargement on Canadian trade. Our sectoral aggregation of the GTAP database is shown in Table C-9 and the basic economic data on the countries and regions used in this study are presented in Table C-10.

SCENARIOS

Four scenarios have been developed to address various aspects of a possible Canada-EU free trade agreement and the European Union enlargement. The scenarios vary along two dimensions. First, is the geographical dimension of the free trade agreement. The EU is always a part of the modelled FTA but its counterparts vary. We consider two major cases. The first assumes that Canada enters into an FTA with the EU(15). In a second case, the Applicants (i.e., the 13 candidate countries for accession to the EU) become members of the EU and Canada enters into an FTA with the enlarged EU.

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[1] In addition to Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom, it also includes: the Channel Islands, French Guiana, Gibraltar, Guadeloupe, Holy See, Isle of Man, Martinique, Monaco, Reunion, Saint Pierre and Miquelon, and San Marino.

[2] For the purpose of this study, the Applicants are defined as Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia, and Turkey.

[3] The full list of candidate countries includes Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, and Turkey.

The second dimension by which the scenarios differ has to do with the extent of liberalization of trade in the agricultural sector. Two potential developments are considered. In the first case, there is no liberalization of trade in agriculture. In this instance, the FTA covers all sectors except *Agriculture* and *Processed food* sectors – parties to the Agreement leave their tariffs and subsidies on agricultural products and food at their initial levels. The second case involves the full liberalization of trade in *Agriculture*, *Processed food* as well as for the other eight sectors. This involves the removal of all tariffs on food imports and the elimination of all taxes and subsidies on food exports. The reader is referred to Chapter IV for the assumptions about agriculture liberalization. For purposes of exposition, the two "agriculture" dimensions (i.e., no agriculture liberalization and complete liberalization in agriculture) are assigned the letters "a" and "b," respectively.

The scenarios differ in terms of the shocks applied. There are two sets of policy variables which are shocked over the course of this study. These are the bilateral import tariffs themselves and the export taxes and subsidies on food. Modelling a free trade agreement involves reducing bilateral tariff rates between FTA parties from their current level to zero, while preserving tariff rates with parties which are not involved in the FTA at the initial level. On the other hand, modelling trade liberalization in agriculture is a little more complex. It involves removal of all tariffs on agricultural imports and the elimination of taxes and subsidies on food exports.

SUMMARY OF EXPERIMENTS

#	Country/ Region FTA	Agriculture
1a	Canada-EU	No liberalization of agriculture
1b	Canada-EU	Full liberalization of agriculture between Canada and the EU
2a	Canada-EU-Applicants	No liberalization of agriculture between Canada, the EU and the Applicants; "common market for agriculture" between the EU and the Applicants
2b	Canada-EU-Applicants	Full liberalization of agriculture between Canada, the EU, and the Applicants; "common market for agriculture" between the EU and the Applicants

THE CGE MODELLING RESULTS FOR CANADA'S TRADE

The principal results of the CGE model are presented and discussed in the main body of the text of this study. Below, however, is a detailed sectoral analysis of the trade impacts of each of the four scenarios. We begin by examining the changes in the geographical composition of Canadian international trade in *Agriculture* and *Processed food*. A total amount of Canadian international trade in agriculture and food products does not change significantly even with trade liberalization of agriculture in the framework of Canada-EU FTA.

Without the liberalization in agricultural trade there are very moderate, mostly negative changes in the trade between Canada, the EU, and the Applicants in *Agriculture* and *Processed food*. On the export side, there are significant changes only when there is a full liberalization of agricultural trade (scenarios 1b and 2b). In the case of EU enlargement, for example, *Agricultural* exports to the EU jump by roughly 35 per cent, while exports of the *Processed food* to the EU increase by 66 per cent (scenario 2b). Not surprisingly, there is an even larger increase in the exports of *Processed food* to the Applicants when they are partners in an FTA involving Canada. However, there is a drop in *Agriculture* exports to the Applicants even when they are part of the FTA with Canada. This is explained by the fact that Canada is assumed to remove export subsidies in the framework of the trade liberalization in agricultural goods. For similar reasons the EU is also assumed to remove its export subsidies, and Canadian imports of *Agriculture* products from the EU decline by roughly 14 per cent under the full liberalization scenarios. However, imports of *Processed food* from the EU could rise by 9–10 per cent. Under the enlargement scenario (scenario 2b), the liberalization of trade in *Processed food* leads to an increase of Canadian imports from the Applicants by 55 per cent. Exports of *Agriculture* and *Processed food* from Canada to the US and Mexico are negatively affected by a Canada-EUFTA. However, Canadian imports of *Agriculture* products from these countries rise moderately.

Overall Canadian trade in *Mining* products almost does not change as the result of the Canada-EU FTA. The export side declines slightly while imports slightly increase. Notwithstanding this observation, on of the most striking observations drawn from the four scenarios is that Canadian imports of *Mining* products from the EU jumps up by 31 per cent under any scenario. At the same time, Canadian exports to the EU are almost unchanged. The reason for this potential result is because Canada applies a tariff of 5.82 per cent on imports of these products from the EU, while the corresponding EU tariff on imports from Canada is only 0.22 per cent. Thus, when trade is liberalized and both Canada and the EU reduce their tariffs to zero, the effect on Canadian imports (EU exports) is much greater than the effect on Canadian exports (EU imports). For this reason, *Mining* products from the Applicant countries become relatively less competitive on the Canadian market vis-à-vis their EU counterparts and Canada reduces its imports from the Applicants. Buttressing the situation is the fact that Canadian tariffs are quite small on imports of *Mining* products from the Applicants countries (1.75 per cent), so the benefits of tariff elimination to the Applicants are quite small. On the other hand, Canadian exports of *Mining* products to the Applicants increase by more than 7 per cent in all scenarios where the Applicants are involved in trade liberalization with Canada.

Other interesting changes in the geographical dimension of Canada's international trade occur in manufacturing sectors (other than *Processed food*). Canadian foreign trade in these sectors intensifies with both import and export registering moderate gains. The largest percentage increase in overall trade occurs in *Textiles*, where tariff barriers on both sides are currently the highest. If Canada enters into free trade with the EU, our *Textiles* exports to Europe could expand by some 65 per cent. If the Applicants join Canada and the EU in the FTA, Canadian exports to the EU will grow by 58 per cent, and our exports to the Applicants jump by 45 per cent. The increases are even larger on the import side. Canadian *Textiles* imports from the EU rise 2.5 times and, if the Applicants are free trade partners as well,

our imports from them rises by a similar proportion. Canadian exports of *Textiles* to the US and Mexico also increase by 1 to 2 per cent while imports from these destinations fall by 10 to 12 per cent.

TABLE C-1

GROWTH OF CANADIAN INTERNATIONAL TRADE UNDER CANADA-EU FTA WITHOUT LIBERALIZATION OF AGRICULTURE, SCENARIO 1A (PER CENT)

Sector	Exports from Canada to						Imports to Canada from					
	US	Mexico	EU	Applic-ants	ROW	Total	US	Mexico	EU	Applic-ants	ROW	Total
Agriculture	-0.42	-0.50	-0.25	-0.33	-0.41	-0.39	0.14	0.10	-0.17	-0.04	0.02	0.09
Mining	-0.18	-0.23	1.20	-0.05	-0.10	-0.07	-2.13	-2.21	31.73	-2.39	-2.31	1.30
Processed food	-0.72	-0.83	-0.52	-0.62	-0.69	-0.70	0.39	0.29	-0.05	0.10	0.19	0.28
Textiles	1.66	1.64	64.88	2.07	1.86	5.61	-10.79	-10.89	153.1	-11.15	-11.03	5.56
Iron and steel	-0.28	-0.33	10.56	-0.05	-0.18	0.61	-2.76	-2.85	34.63	-3.08	-2.97	2.03
Machin. and equip.	0.05	0.02	25.35	0.32	0.15	1.98	-1.85	-1.94	24.74	-2.20	-2.08	0.83
Transport. equip.	0.76	0.98	38.63	1.52	1.27	1.59	-1.92	-2.13	62.35	-2.58	-2.35	1.13
Chemicals	-0.08	-0.12	14.01	0.12	-0.01	0.55	-2.26	-2.32	22.82	-2.48	-2.41	1.11
Other mfg.	-0.59	-0.76	10.37	-0.45	-0.57	0.57	-2.10	-2.19	39.30	-2.42	-2.33	1.58
Services	-0.93	-1.03	-0.61	-0.83	-0.89	-0.87	0.57	0.49	0.15	0.31	0.39	0.48
Total	0.02	-0.18	11.24	0.16	-0.32	0.78	-1.99	-2.17	34.27	-4.06	-2.74	1.13

TABLE C-2

GROWTH OF CANADIAN INTERNATIONAL TRADE UNDER CANADA-EU FTA WITH LIBERALIZATION OF AGRICULTURE, SCENARIO 1B (PER CENT)

Sector	Exports from Canada to						Imports to Canada from					
	US	Mexico	EU	Applic-ants	ROW	Total	US	Mexico	EU	Applic-ants	ROW	Total
Agriculture	-2.09	-2.26	35.20	-2.19	-2.18	2.42	1.33	1.27	-14.24	1.26	1.26	0.64
Mining	-0.32	-0.36	1.02	-0.23	-0.26	-0.22	-2.15	-2.24	31.74	-2.39	-2.32	1.29
Processed food	-1.26	-1.39	68.06	-1.25	-1.29	3.10	-0.22	-0.33	10.11	-0.44	-0.39	1.35
Textiles	1.35	1.32	64.32	1.73	1.53	5.29	-10.74	-10.87	153.4	-11.07	-10.98	5.63
Iron and steel	-0.50	-0.57	10.25	-0.33	-0.46	0.37	-2.78	-2.88	34.65	-3.07	-2.98	2.02
Machin. and equip.	-0.17	-0.22	25.03	0.07	-0.09	1.74	-1.84	-1.95	24.78	-2.17	-2.06	0.85
Transport. equip.	0.50	0.66	38.13	1.16	0.92	1.32	-1.99	-2.22	62.33	-2.77	-2.40	1.06
Chemicals	-0.25	-0.30	13.79	-0.08	-0.19	0.38	-2.22	-2.29	22.89	-2.43	-2.37	1.15
Other mfg.	-1.02	-1.26	9.78	-1.00	-1.08	0.11	-2.00	-2.10	39.51	-2.29	-2.20	1.70
Services	-1.18	-1.27	-0.87	-1.10	-1.15	-1.13	0.69	0.59	0.29	0.45	0.51	0.60
Total	-0.28	-0.70	15.62	-0.29	-0.83	0.79	-1.96	-2.17	34.82	-3.92	-2.66	1.20

TABLE C-3

GROWTH OF CANADIAN INTERNATIONAL TRADE UNDER CANADA-EU-APPLICANTS FTA WITHOUT LIBERALIZATION OF AGRICULTURE, SCENARIO 2A (PER CENT)

	Exports from Canada to						Imports to Canada from					
Sector	US	Mexico	EU	Applic-ants	ROW	Total	US	Mexico	EU	Applic-ants	ROW	Total
Agriculture	-0.29	-0.37	-1.68	-35.53	-0.41	-0.76	0.09	0.03	-0.76	-16.29	0.21	0.01
Mining	-0.18	-0.50	1.25	7.50	-0.11	-0.05	-2.12	-2.19	31.16	-0.60	-2.26	1.28
Processed food	-0.65	-0.81	-1.63	19.13	-0.64	-0.62	0.42	0.26	-0.28	-10.78	0.31	0.25
Textiles	2.01	1.80	58.58	45.56	2.02	5.83	-12.54	-12.67	148.8	141.83	-12.68	6.32
Iron and steel	-0.24	-1.08	10.44	10.85	-0.03	0.70	-2.77	-2.79	33.96	14.25	-2.93	2.06
Machin. and equip.	0.00	-0.05	25.62	41.77	0.14	2.11	-1.83	-1.94	24.07	5.28	-2.00	0.80
Transport. equip.	0.68	0.96	37.44	31.13	1.28	1.61	-1.88	-2.12	61.07	65.87	-2.21	1.12
Chemicals	-0.07	-0.16	14.18	24.78	-0.01	0.61	-2.24	-2.33	22.43	5.35	-2.38	1.09
Other mfg.	-0.58	-0.78	10.39	21.63	-0.49	0.64	-2.26	-2.38	38.41	66.62	-2.41	1.62
Services	-0.75	-0.98	-0.10	6.29	-0.68	-0.57	0.65	0.53	-0.23	-11.46	0.53	0.42
Total	0.01	-0.24	11.09	17.57	-0.24	0.85	-2.02	-2.21	33.36	37.58	-2.79	1.13

TABLE C-4

GROWTH OF CANADIAN INTERNATIONAL TRADE UNDER CANADA-EU-APPLICANTS FTA WITH LIBERALIZATION OF AGRICULTURE, SCENARIO 2B (PER CENT)

	Exports from Canada to						Imports to Canada from					
Sector	US	Mexico	EU	Applic-ants	ROW	Total	US	Mexico	EU	Applic-ants	ROW	Total
Agriculture	-2.01	-2.19	33.19	-14.76	-2.23	2.09	1.32	1.23	-14.71	-19.58	1.49	0.58
Mining	-0.34	-0.64	1.07	7.32	-0.28	-0.21	-2.14	-2.23	31.17	-0.60	-2.27	1.27
Processed food	-1.21	-1.40	66.17	107.61	-1.25	3.52	-0.32	-0.49	9.72	55.39	-0.41	1.42
Textiles	1.69	1.48	58.02	45.06	1.68	5.49	-12.50	-12.66	149.1	142.09	-12.63	6.40
Iron and steel	-0.48	-1.34	10.11	10.53	-0.32	0.44	-2.80	-2.83	33.97	14.27	-2.94	2.04
Machin. and equip.	-0.24	-0.30	25.29	41.38	-0.12	1.86	-1.83	-1.95	24.11	5.33	-1.99	0.81
Transport. equip.	0.41	0.62	36.91	30.62	0.92	1.33	-1.96	-2.22	61.05	65.87	-2.26	1.04
Chemicals	-0.24	-0.35	13.95	24.51	-0.20	0.43	-2.20	-2.31	22.50	5.42	-2.33	1.13
Other mfg.	-1.03	-1.31	9.77	20.93	-1.02	0.16	-2.14	-2.28	38.64	66.89	-2.28	1.74
Services	-1.01	-1.23	-0.38	5.99	-0.96	-0.85	0.77	0.64	-0.09	-11.32	0.67	0.55
Total	-0.3	-0.77	15.39	22.40	-0.77	0.86	-1.99	-2.21	33.90	40.69	-2.72	1.21

A Canada-EU FTA could have a positive impact on Canadian trade in *Machinery and equipment*, and *Transportation equipment*. Canadian exports of *Transportation equipment* to the EU could increase by 38 per cent while imports of goods in this category from the EU may rise by 62 per cent. Similarly, both Canadian exports and Canadian imports of *Machinery and equipment* in trade with the EU could increase by 25 per cent. If the Applicants join Canada and the EU in an FTA, Canadian exports of *Transportation equipment* to the Applicants will grow by 31 per cent, while Canadian export of *Machinery and equipment* to the Applicants could be more than 40 per cent. There are similarly large increases for *Transportation equipment* on the import side. For example, Canadian *Transportation equipment* imports from the Applicants rise by 66 per cent. The gains are much more modest in imports of *Machinery and equipment* (about 5 per cent).

Canada-EU trade rises in other manufacturing sectors as the result of Canada-EU FTA. Canadian exports of *Iron and steel*, *Chemical* and *Other manufacturing* products to the EU increase by 10–14 per cent while Canadian imports from the EU rise by 20–40 per cent. Similar increases occur in Canadian trade with the Applicants when these countries are part of an enlarged Canada-EU FTA.

A Canada-EU FTA would have a negative impact on US manufacturing exports. The EU competes with the US in the Canadian market for these products. Canadian imports from the US falls on average by about 2 per cent under our assumptions. While this looks like a relatively small number, given the large volume of trade between US and Canada the actual volume of a trade diversion could be rather significant. Canadian exports to the US are largely unaffected by a free trade agreement with the EU.

SENSITIVITY ANALYSIS

A sensitivity analysis of Canada-EU FTA simulation was performed using the Systematic Sensitivity Analysis (SSA) utility available in RunGTAP Version 5.0. The SSA utility allows one to postulate a shape and parameters of distribution for chosen parameters. Using this information, the SSA utility samples parameters from the distribution, solves the model several times and reports estimated mean and standard deviation for the endogenous variables.

We have performed a sensitivity analysis on the parameters which define the elasticities of substitution between domestic and imported goods in the Armington production structure. We chose these parameters for the SSA procedure because of their key role in the models behaviour — these parameters define the sensitivity of endogenous variables such as volumes of output and trade to changes in the level of tariff protection. At the same time, unlike volume of output or trade flows, these parameters are not directly observable and are difficult to estimate. It is possible that the values which are used in benchmark simulation are wrong. Therefore it is important to estimate how results could change if the elasticities would be different.

In order to perform the SSA, it is assumed that elasticities of substitution are uniformly distributed, bounded below at 50 per cent of the benchmark value of the elasticity and bounded above at 150 per cent of the benchmark value of the elasticity. For example, the benchmark value of the elasticity of substitution in *Agriculture* is 2.44. We vary the parameter estimates over the range bounded below at 1.22 (= 50% of 2.44) and above at 3.66 (= 150% of 2.44) and

independently draw sample estimates of this elasticity and solve the model several times. For the results reported below, the model was solved twenty times by the SSA utility in order to get estimates of means and standard deviations of the endogenous parameters under examination.

With the estimates of the means and standard deviations, it is possible to construct confidence intervals for the endogenous variables of the model. Because the form of distribution of endogenous variables is unknown, we use the Chebyshev inequality to calculate our confidence intervals for our parameter values. The Chebyshev inequality essentially relates the probability of any random variable to take a particular value inside a given interval, defined in terms of the number of standard deviations from the mean. For example, according to Chebyshev inequality, a 90 per cent confidence interval is defined by ±3.162 standard deviations from the mean. That is, for any randomly distributed variable, for example, with a mean equal to 10 and a standard deviation equal to 1, the 90 per cent confidence interval is [6.838; 13.162].

The results of the SSA are reported in Tables C-5 to C-8. In each table, the second column reports the value of endogenous variable from the original simulation. The next two columns to the right present the means and standard deviations of the parameter distributions obtained from the SSA utility. The last two columns provide the upper and lower boundaries for the 90 per cent confidence intervals for the parameter estimates.

Table C-5 reports the results of the sensitivity analysis for welfare changes. It shows, that for different elasticities, the welfare implications for Canada could possibly deviate significantly from the reported results. Nevertheless, with a high degree of confidence it can be concluded that welfare changes are positive. That is, Canada would likely benefit from the Canada-EU FTA even if elasticities of substitution between domestic and imported inputs were much different from those used in our CGE analysis. They also suggest that welfare implications for the US, Mexico, and the ROW are negative. At the same time, our sensitivity analysis demonstrates that negative welfare implications for the EU could change to positive with different assumptions about the values of the elasticities.

TABLE C-5

SENSITIVITY ANALYSIS OF CHANGES IN WELFARE BY COUNTRY/REGION ($US MILLIONS)

Country/ Region	GTAP Simulation	Mean Value	Standard Deviation	90% Confidence Interval	
				Lower Boundary	Upper Boundary
Canada	163	165	56	-11	340
US	-884	-912	159	-1,414	-410
Mexico	-25	-26	4	-37	-14
EU	-293	-335	251	-1,128	459
Applicants	3,665	3,763	570	1,960	5,566
ROW	-2,770	-2,831	373	-4,010	-1,653

The results of the SSA reported in Table C-6 show that the direction of changes in output could differ from the benchmark simulation results in four sectors: *Textiles, Iron and steel, Chemicals,* and *Other manufacturing*. For example, in *Textiles,* the Canada-EU FTA could lead to a decline in output as large as 3.15 per cent, or it could possibly grow by 0.77 per cent with different elasticity values.

TABLE C-6

SENSITIVITY ANALYSIS OF CHANGES IN OUTPUT BY SECTOR IN CANADA (PER CENT)

Sector	GTAP Simulation	Mean Value	Standard Deviation	90% Confidence Interval Lower Boundary	90% Confidence Interval Upper Boundary
Agriculture	-0.27	-0.27	0.06	-0.46	-0.08
Mining	-0.26	-0.25	0.05	-0.42	-0.08
Processed food	-0.19	-0.19	0.06	-0.39	-0.00
Textiles	-1.13	-1.19	0.62	-3.15	0.77
Iron and steel	-0.04	-0.04	0.10	-0.37	0.29
Machinery and equipment	0.99	0.99	0.27	0.12	1.86
Transportation equipment	1.13	1.12	0.32	0.11	2.14
Chemicals	-0.18	-0.19	0.09	-0.48	0.11
Other manufacturing	0.07	0.07	0.08	-0.18	0.31
Services	-0.04	-0.04	0.01	-0.08	-0.00

TABLE C-7

SENSITIVITY ANALYSIS OF CHANGES IN CANADIAN EXPORTS, F.O.B. WEIGHTS (PER CENT)

Sector	GTAP Simulation	Mean Value	Standard Deviation	90% Confidence Interval Lower Boundary	90% Confidence Interval Upper Boundary
Agriculture	-0.76	-0.75	0.17	-1.29	-0.20
Mining	-0.05	-0.04	0.09	-0.34	0.26
Processed food	-0.62	-0.63	0.22	-1.31	0.06
Textiles	5.84	6.10	2.45	-1.64	13.85
Iron and steel	0.70	0.71	0.27	-0.15	1.58
Machinery and equipment	2.11	2.12	0.66	0.03	4.21
Transportation equipment	1.61	1.61	0.5	0.05	3.18
Chemicals	0.61	0.62	0.24	-0.12	1.37
Other manufacturing	0.65	0.65	0.25	-0.13	1.43
Services	-0.33	-0.32	0.15	-0.78	0.14

TABLE C-8

SENSITIVITY ANALYSIS OF CHANGES IN CANADIAN IMPORTS, C.I.F. WEIGHTS (PER CENT)

Sector	GTAP Simulation	Mean Value	Standard Deviation	90% Confidence Interval Lower Boundary	90% Confidence Interval Upper Boundary
Agriculture	0.01	0.00	0.04	-0.13	0.14
Mining	1.27	1.28	0.39	0.05	2.50
Processed food	0.25	0.25	0.09	-0.03	0.53
Textiles	5.58	5.80	2.16	-1.04	12.64
Iron and steel	2.12	2.13	0.56	0.35	3.92
Machinery and equipment	0.80	0.81	0.18	0.23	1.39
Transportation equipment	1.14	1.15	0.34	0.09	2.22
Chemicals	1.12	1.13	0.30	0.18	2.07
Other manufacturing	1.57	1.59	0.47	0.11	3.06
Services	0.42	0.41	0.11	0.05	0.78

* GTAP simulation values are different from the changes in Canadian import reported earlier. Before, we reported foreign exports to Canada aggregated with f.o.b. weights as Canadian import values.

Tables C-7 and C-8 above report our sensitivity results for Canadian exports and imports. Canadian exports are especially vulnerable to changes in elasticities of substitution between domestic and imported goods. Exports of all sectors, except *Agriculture, Machinery and equipment* and *Transportation equipment* could increase or decrease depending on the particular value of the elasticity used in the CGE analysis. This may be explained, perhaps, by the fact that changes in most sectors, except for *Textiles*, were rather small under the benchmark Canada-EU FTA simulations. On the other hand, our results for Canadian imports are more robust. Only imports in *Agriculture* and, to a lesser extent *Textiles*, could decline rather than increase as the original simulation suggests.

FURTHER REMARKS ABOUT CGE ANALYSIS

The GTAP modelling framework and database have certain limitations which are important to keep in mind when interpreting the results. The GTAP model is being used to simulate the effects of eliminating tariff barriers and export subsidies within the framework of a Canada-EU free trade agreement. The results are what economists call *comparative static*, providing an indication of how the regions in question and international trade flows would have looked like if, for example, the FTA between Canada and EU were in place in 1995 (Dee and Hanslow, 2000) as opposed to indicating the likely changes that would have occurred in the economy over 1995 to the present as result of a Canada-EU FTA or as a result of EU enlargement.

Indeed, many changes in the policy variables and economic indicators have already occurred. For example, GTAP's input/output tables for the Eastern European countries are based on World Bank data for 1989 – before their transition from centrally-planned to market-based economies. Undoubtedly, the structure of the East European economies has changed profoundly over the interval. Moreover, since 1995, most of the Eastern European countries have concluded a number of preferential agreements with the EU which have greatly reduced tariffs on their export to the European Union. These developments are not captured by the model.

Finally, the imposition of the Armington assumption assigning competing imports the same elasticity of substitution (i.e., in other words, they completely interchangeable with each other) may not be strictly true. On face value, if competing imports are imperfect substitutes for domestically produced goods, it would stand to reason that they are imperfect substitutes for each other. While this assumption may affect the results for any pair or pairs of countries, it should not affect the overall results.

Additional Data Tables for this Appendix

Table C-9

Sectoral Aggregation

Canada-EU FTA	GTAP Database 4
Agriculture	Paddy rice; wheat; cereal, grains; vegetables, fruit, nuts; oil seeds; sugar cane, sugar beet; plant-based fibres; crops; bovine cattle, sheep and goats, horses; animal products; raw milk; wool, silkworm cocoons; forestry; fishing; bovine cattle, sheep and goat, horse meat products.
Mining	Coal; oil; gas; minerals; petroleum, coal products; mineral products.
Processed food	Vegetable oils and fats; dairy products; processed rice; sugar; food products; beverages and tobacco products.
Textiles	Textiles; wearing apparel.
Iron and steel	Ferrous metals; metals; metal products.
Machinery and equipment	Electronic equipment; machinery and equipment.
Transportation equipment	Motor vehicles and parts; transport equipment.
Chemicals	Chemical, rubber, plastic products.
Other manufacturing	Leather products; wood products; paper products, publishing; manufactures.
Services	Electricity; gas manufacture, distribution; water; construction; trade, transport; financial, business, recreational services; public administration and defence, education, health; dwellings.

TABLE C-10

GDP, EXPORTS AND IMPORTS BY REGION ($US MILLIONS)

Country/Region	GDP	Exports	Imports
Canada	574,189	204,074	180,193
US	7,121,382	751,969	882,628
Mexico	280,676	88,259	72,064
EU	8,213,820	2,337,643	2,298,618
Applicants	465,197	151,420	158,413
ROW	11,657,804	2,359,439	2,300,888

TABLE C-11

ELASTICITIES OF SUBSTITUTION USED IN THE GTAP MODEL (10-SECTOR AGGREGATION)

Sector	Elasticity of Substitution Between Domestic and Imported Goods in Armington Structure (*ESBD*)	Elasticity of Substitution Between Capital, Labour and Land in Production of Value-added (*ESBV*)	Elasticity of Substitution Between Imports from Different Sources in Armington Structure (*ESBM*)
Agriculture	2.44	0.26	4.60
Mining	2.51	0.63	5.30
Processed food	2.40	1.12	4.72
Textiles	3.15	1.26	6.59
Iron and steel	2.80	1.26	5.60
Machinery and equipment	2.80	1.26	5.60
Transportation equipment	5.20	1.26	10.40
Chemicals	1.90	1.26	3.80
Other manufacturing	2.48	1.26	5.57
Services	1.95	1.40	3.81

Country/Region	Canada	US	Mexico	EU	Applicants	ROW
Food	6.5	6.5	18.3	7.3	20.9	12.8
Other Primary	3.6	1.6	4.9	0.7	3.6	2.4
Manufacturing	21.1	24.4	25.5	22.2	29.7	29.2
Services	68.9	67.5	51.2	69.8	45.8	55.6

APPENDIX D

TRADE, TARIFF, AND INVESTMENT DATA

TABLE D-1

SUMMARY TRADE STATISTICS BETWEEN CANADA AND THE EUROPEAN UNION, 1990-1999 (MILLIONS OF DOLLARS)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Exports										
Agricultural products	1,689.7	1,496.9	1,428.4	1,101.6	1,273.8	1,551.8	1,743.0	1,828.8	1,706.8	2,361.0
Other primary products	1,295.2	1,150.6	1,263.2	1,351.0	1,775.4	2,140.4	1,782.1	1,857.4	1,907.8	1,649.2
Manufacturing goods	9,572.8	9,377.2	9,253.1	8,774.7	9,230.0	12,557.1	11,976.2	11,145.6	11,779.0	12,019.1
All goods	12,557.8	12,024.7	11,944.8	11,227.3	12,279.2	16,249.4	15,501.3	14,831.8	15,393.6	16,029.3
Services	3,828.0	3,931.0	4,155.0	4,517.0	5,560.0	6,164.0	6,724.0	7,236.0	7,890.0	8,061.0
Total G&S	16,385.8	15,955.7	16,099.8	15,744.3	17,839.2	22,413.4	22,225.3	22,067.8	23,283.6	24,090.3
Imports										
Agricultural products	2,052.5	1,626.9	1,348.8	1,475.7	1,482.3	1,549.7	1,743.6	1,899.6	934.2	1,650.6
Other primary products	1,264.9	1,210.6	1,279.4	1,334.8	1,542.2	1,617.1	1,689.0	1,824.8	2,044.0	2,211.3
Manufacturing goods	13,555.1	12,749.2	12,765.6	13,090.4	16,281.8	19,084.5	18,929.0	22,810.1	24,928.2	27,525.4
All goods	16,872.6	15,586.8	15,393.8	15,900.9	19,306.3	22,251.4	22,361.6	26,534.5	27,906.4	31,387.3
Services	5,937.0	5,621.0	5,990.0	7,038.0	7,817.0	8,046.0	7,923.0	8,729.0	9,378.0	9,511.0
Total G&S	22,809.6	21,207.8	21,383.8	22,938.9	27,123.3	30,297.4	30,284.6	35,263.5	37,284.4	40,898.3
Trade balance										
Agricultural products	-362.9	-130.0	79.6	-374.1	-208.6	2.1	-0.7	-70.8	772.6	710.4
Other primary products	30.3	-60.0	-16.2	16.2	233.2	523.3	93.1	32.6	-136.2	-562.1
Manufacturing goods	-3,982.3	-3,372.1	-3,512.5	-4,315.8	-7,051.9	-6,527.4	-6,952.8	-11,664.5	-13,149.1	-15,506.3
All goods	-4,314.8	-3,562.1	-3,449.1	-4,673.7	-7,027.2	-6,002.0	-6,860.4	-11,702.7	-12,512.8	-15,358.0
Services	-2,109.0	-1,690.0	-1,835.0	-2,521.0	-2,257.0	-1,882.0	-1,199.0	-1,493.0	-1,488.0	-1,450.0
Total G&S	-6,423.8	-5,252.1	-5,284.1	-7,194.7	-9,284.2	-7,884.0	-8,059.4	-13,195.7	-14,000.8	-16,808.0
Two-way trade										
Goods	29,430.3	27,611.4	27,338.6	27,128.2	31,585.5	38,500.8	37,862.9	41,366.3	43,300.0	47,416.6
Services	9,765.0	9,552.0	10,145.0	11,555.0	13,377.0	14,210.0	14,647.0	15,965.0	17,268.0	17,572.0
Total G&S	39,195.3	37,163.4	37,483.6	38,683.2	44,962.5	52,710.8	52,509.9	57,331.3	60,568.0	64,988.6

Source: Statistics Canada

TABLE D-2

TOTAL AND NON-US SHARES OF TRADE BETWEEN CANADA AND THE EUROPEAN UNION, 1990-1999 (PER CENT)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
EU share of exports										
Other primary products	10.0	8.9	7.9	5.8	6.1	6.6	6.5	6.4	6.6	7.5
Agricultural products	9.6	8.4	7.9	8.4	9.6	10.3	7.6	7.2	7.3	6.4
Manufacturing goods	8.6	8.7	7.7	6.1	5.3	6.2	5.7	4.9	4.8	4.4
Total goods to EU-15	8.90	8.67	7.73	6.31	5.76	6.55	5.93	5.27	5.18	4.86
EU share of imports										
Other primary products	26.2	24.0	18.8	19.0	18.1	18.1	17.0	15.4	8.7	15.3
Agricultural products	14.2	13.3	13.0	12.0	12.0	11.9	11.8	11.4	11.6	12.3
Manufacturing goods	11.8	11.1	10.2	9.0	9.3	9.8	9.5	9.7	9.5	9.7
Total goods from EU-15	12.86	11.94	10.79	9.70	9.85	10.23	10.01	10.07	9.63	10.08
EU share of non-US exports										
Other primary products	26.4	26.1	28.6	24.5	26.1	25.4	27.6	28.5	30.0	39.1
Agricultural products	16.8	15.1	14.7	18.8	20.2	20.3	15.7	15.0	17.5	16.9
Manufacturing goods	42.2	41.8	40.3	35.7	32.9	34.0	34.8	32.8	39.0	40.5
Total goods to EU-15	34.16	33.61	32.68	30.97	29.42	30.30	29.80	28.10	32.88	35.25
EU share of non-US imports										
Other primary products	33.5	31.3	26.4	25.8	24.4	24.1	22.3	21.1	14.1	21.7
Agricultural products	32.3	31.3	32.0	30.3	29.1	28.8	28.3	28.1	28.9	30.6
Manufacturing goods	36.8	33.3	31.5	29.7	31.4	31.7	32.3	32.8	32.0	31.7
Total goods from EU-15	36.03	32.94	31.02	29.34	30.54	30.79	30.89	31.23	30.50	30.87

Source: Statistics Canada

TABLE D-3

EXPORTS TO THE EUROPEAN UNION BY SECTOR, 1990-1999 (MILLIONS OF DOLLARS)

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agricultural and related service industries	479.4	409.9	488.6	699.9	1,106.3	1,380.6	1,019.6	1,132.8	1,091.6	860.1
Fishing and trapping industries	64.1	61.9	66.1	57.7	71.0	81.3	84.6	74.1	90.8	94.1
Logging and forestry industries	12.4	8.6	6.4	6.3	12.5	18.0	11.8	10.7	14.8	19.6
Mining, quarrying and oil well industries	1,677.3	1,488.3	1,422.1	1,095.2	1,261.3	1,533.8	1,731.1	1,818.2	1,692.0	2,341.4
Sic 1000 - Food industries	691.5	589.7	608.9	498.9	510.6	595.9	579.3	576.4	622.6	602.7
Sic 1100 - Beverage industries	27.0	34.9	31.2	31.3	35.6	36.9	33.6	38.9	49.0	57.4
Sic 1200 - Tobacco products industries	33.3	54.3	68.3	63.3	51.9	45.8	65.1	35.2	53.8	34.9
Sic 1500 - Rubber products industries	33.6	33.5	32.4	31.9	38.1	51.5	66.6	58.5	61.0	44.9
Sic 1600 - Plastic products industries	31.2	35.9	38.4	47.9	43.4	77.7	112.5	88.1	101.9	108.5
Sic 1700 - Leather and allied products ind.	14.9	13.5	12.8	12.7	11.6	10.3	17.9	17.9	22.4	23.5
Sic 1800 - Primary textile industries	110.4	77.8	60.8	56.6	61.4	78.1	74.4	60.6	60.4	66.7
Sic 1900 - Textile products industries	22.7	23.3	21.2	20.5	23.4	44.3	43.8	47.4	49.9	43.9
Sic 2400 - Clothing industries	21.3	28.2	29.8	31.4	45.6	54.2	60.7	61.0	66.2	58.2
Sic 2500 - Wood industries	1,100.8	895.4	863.0	692.8	811.7	871.8	725.5	860.7	761.2	700.7
Sic 2600 - Furniture and fixture industries	26.7	39.6	36.1	30.9	35.2	43.9	61.7	48.7	70.4	81.7
Sic 2700 - Paper and allied products ind.	2,344.3	2,361.6	2,355.5	1,879.0	2,406.8	3,809.9	2,781.7	2,479.9	2,364.8	2,339.0
Sic 2800 - Printing, publishing and allied ind.	39.5	44.9	64.0	67.9	63.6	86.0	83.5	59.8	66.3	75.1
Sic 2900 - Primary metal industries	1,876.0	1,619.4	1,749.0	1,710.5	1,689.9	2,006.6	2,072.7	1,747.9	1,604.7	1,167.4
Sic 3000 - Fabricated metal products ind.	227.4	208.0	204.7	236.8	223.9	303.7	344.5	357.0	415.9	370.7
Sic 3100 - Machinery industries	479.5	467.3	442.9	446.9	446.0	593.4	668.8	815.7	959.7	924.4
Sic 3200 - Transportation equipment ind.	990.4	1,156.4	1,245.5	1,576.9	1,092.1	1,691.5	1,839.9	1,320.8	1,956.8	2,478.9
Sic 3300 - Electrical and electronic products	1,085.1	1,211.3	1,024.3	961.4	1,174.4	1,501.3	1,566.9	1,621.4	1,682.6	1,905.6
Sic 3500 - Non-metallic mineral products	76.9	69.4	74.8	70.3	76.5	93.7	96.5	99.9	98.8	90.0
Sic 3600 - Refined petroleum and coal prods.	89.1	213.1	73.0	4.1	26.2	14.7	45.4	4.5	6.5	13.5
Sic 3700 - Chemical and chemical products	644.3	523.1	478.7	412.8	440.9	628.0	593.6	697.9	748.4	850.4
Sic 3900 - Other manufacturing industries	358.8	355.5	446.5	483.3	519.4	596.5	719.6	697.9	681.1	675.9
Total exports to EU-15	12,557.8	12,024.7	11,944.8	11,227.3	12,279.2	16,249.4	15,501.3	14,831.8	15,393.6	16,029.3

Source: Statistics Canada

TABLE D-4

IMPORTS FROM THE EUROPEAN UNION BY SECTOR, 1990-1999 (MILLIONS OF DOLLARS)

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agricultural and related service industries	128.6	117.4	121.0	150.6	151.0	159.4	169.7	179.9	209	219.3
Fishing and trapping industries	9.1	8.4	5.1	6.7	8.5	8.9	8.1	10.0	8.6	6.5
Logging and forestry industries	1.1	0.7	1.2	0.6	1.4	3.1	0.7	1.4	1.7	0.9
Mining, quarrying and oil well industries	2,051.5	1,626.2	1,347.6	1,475.1	1,480.9	1,546.6	1,743.0	1,898.3	932.5	1,649.8
Sic 1000 - Food industries	631.1	638.9	667.0	686.8	835.9	874.5	910.8	980.5	1,050.2	1,083.2
Sic 1100 - Beverage industries	488.4	438.1	470.7	473.1	537.0	562.1	581.7	636.5	761.2	890.7
Sic 1200 - Tobacco products industries	7.8	7.8	15.6	17.6	9.8	12.3	18.6	17.9	15.0	11.6
Sic 1500 - Rubber products industries	135.6	156.3	156.8	173.3	208.3	241.3	215.9	220.4	245.0	278.6
Sic 1600 - Plastic products industries	194.4	179.5	173.1	183.8	220.6	244.7	226.8	232.6	255.1	263.4
Sic 1700 - Leather and allied products ind.	444.0	347.9	341.8	345.2	417.6	447.9	424.7	459.5	512.2	492.8
Sic 1800 - Primary textile industries	312.8	261.7	267.9	270.5	325.7	341.3	331.9	364.1	407.7	382.6
Sic 1900 - Textile products industries	125.3	109.1	104.5	113.3	130.7	149.0	127.6	154.7	159.6	163.8
Sic 2400 - Clothing industries	404.6	302.4	295.7	290.1	312.6	333.9	297.9	306.9	331.3	303.5
Sic 2500 - Wood industries	46.2	40.9	44.1	47.7	61.8	55.2	55.7	72.8	99.9	107.4
Sic 2600 - Furniture and fixture industries	206.0	176.9	141.9	115.1	143.6	165.7	154.2	177.3	208.6	231.1
Sic 2700 - Paper and allied products ind.	290.9	258.5	261.7	268.3	293.8	352.4	325.0	401.8	490.4	533.6
Sic 2800 - Printing, publishing and allied ind.	256.4	221.9	235.0	248.8	269.8	296.8	271.3	280.5	338.0	324.0
Sic 2900 - Primary metal industries	771.7	659.0	608.1	915.2	1,357.2	1,396.3	1,237.3	1,255.6	1,377.3	1,232.4
Sic 3000 - Fabricated metal products ind.	670.3	650.0	600.6	643.8	784.7	866.1	861.6	955.3	1,161.7	1,183.9
Sic 3100 - Machinery industries	2,653.8	2,211.9	2,148.5	2,368.5	3,085.3	4,039.3	3,864.8	4,907.8	5,345.0	5,840.3
Sic 3200 - Transportation equipment industries	2,405.3	2,635.3	2,499.6	1,841.4	2,188.7	2,537.3	2,849.2	4,872.5	4,728.5	5,662.0
Sic 3300 - Electrical and electronic products	1,341.5	1,519.7	1,432.5	1,528.4	2,116.9	2,502.0	2,356.2	2,284.0	2,736.6	3,353.6
Sic 3500 - Non-metallic mineral products	447.3	405.6	359.7	365.5	410.7	454.6	446.4	524.3	591.2	596.2
Sic 3600 - Refined petroleum and coal prods.	342.8	164.0	315.0	306.8	328.7	213.7	372.9	447.9	271.6	378.9
Sic 3700 - Chemical and chemical products	1,499.5	1,498.9	1,735.2	1,972.0	2,354.7	2,995.2	3,017.5	3,231.7	3,741.8	4,044.8
Sic 3900 - Other manufacturing industries	1,006.7	949.9	1,043.9	1,092.8	1,270.3	1,451.8	1,492.0	1,660.3	1,926.5	2,152.4
Total imports from EU-15	16,872.6	15,586.8	15,393.8	15,900.9	19,306.3	22,251.4	22,361.6	26,534.5	27,906.4	31,387.3

Source: Statistics Canada

TABLE D-5

MERCHANDISE TRADE BALANCE WITH THE EUROPEAN UNION BY SECTOR, 1990-1999 (MILLIONS OF DOLLARS)

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agricultural and related service industries	350.8	292.5	367.6	549.3	955.3	1,221.1	849.9	952.9	882.6	640.8
Fishing and trapping industries	55.0	53.5	61.0	51.0	62.5	72.4	76.4	64.1	82.2	87.6
Logging and forestry industries	11.3	7.9	5.2	5.7	11.1	14.9	11.2	9.3	13.1	18.7
Mining, quarrying and oil well industries	-374.2	-137.9	74.4	-379.8	-219.6	-12.8	-11.9	-80.1	759.5	691.6
Sic 1000 - Food industries	60.5	-49.2	-58.0	-187.9	-325.3	-278.6	-331.6	-404.0	-427.6	-480.5
Sic 1100 - Beverage industries	-461.4	-403.3	-439.5	-441.8	-501.4	-525.1	-548.1	-597.6	-712.3	-833.3
Sic 1200 - Tobacco products industries	25.5	46.5	52.7	45.6	42.1	33.5	46.4	17.3	38.8	23.3
Sic 1500 - Rubber products industries	-102.1	-122.9	-124.4	-141.4	-170.2	-189.8	-149.3	-162.0	-184.0	-233.7
Sic 1600 - Plastic products industries	-163.1	-143.6	-134.7	-135.9	-177.2	-167.0	-114.3	-144.5	-153.2	-154.9
Sic 1700 - Leather and allied products ind.	-429.1	-334.3	-329.0	-332.5	-406.0	-437.6	-406.9	-441.6	-489.8	-469.2
Sic 1800 - Primary textile industries	-202.4	-183.9	-207.1	-213.8	-264.4	-263.2	-257.5	-303.5	-347.2	-315.9
Sic 1900 - Textile products industries	-102.6	-85.8	-83.3	-92.9	-107.4	-104.6	-83.8	-107.3	-109.7	-119.9
Sic 2400 - Clothing industries	-383.3	-274.1	-265.9	-258.7	-267.0	-279.7	-237.2	-245.9	-265.1	-245.3
Sic 2500 - Wood industries	1,054.5	854.5	818.9	645.2	749.9	816.6	669.8	787.9	661.3	593.3
Sic 2600 - Furniture and fixture industries	-179.3	-137.3	-105.8	-84.2	-108.4	-121.8	-92.5	-128.6	-138.2	-149.4
Sic 2700 - Paper and allied products ind.	2,053.5	2,103.1	2,093.8	1,610.7	2,113.0	3,457.5	2,456.7	2,078.1	1,874.4	1,805.4
Sic 2800 - Printing, publishing and allied ind.	-217.0	-177.0	-171.0	-180.9	-206.3	-210.7	-187.8	-220.8	-271.7	-248.9
Sic 2900 - Primary metal industries	1,104.3	960.4	1,140.9	795.3	332.7	610.2	835.4	492.3	227.3	-65.0
Sic 3000 - Fabricated metal products ind.	-442.9	-442.0	-395.9	-407.0	-560.9	-562.4	-517.1	-598.3	-745.8	-813.3
Sic 3100 - Machinery industries	-2,174.3	-1,744.6	-1,705.6	-1,921.6	-2,639.3	-3,445.9	-3,196.0	-4,092.1	-4,385.2	-4,916.0
Sic 3200 - Transportation equipment ind.	-1,414.9	-1,478.9	-1,254.2	-264.5	-1,096.7	-845.8	-1,009.3	-3,551.8	-2,771.6	-3,183.1
Sic 3300 - Rlectrical and electronic products	-256.4	-308.4	-408.3	-566.9	-942.5	-1,000.8	-789.2	-662.6	-1,054.1	-1,448.0
Sic 3500 - Non-metallic mineral products	-370.4	-336.2	-285.0	-295.2	-334.2	-360.9	-349.9	-424.4	-492.4	-506.1
Sic 3600 - Refined petroleum and coal products	-253.7	49.1	-242.1	-302.7	-302.5	-199.0	-327.4	-443.4	-265.1	-365.4
Sic 3700 - Chemical and chemical products	-855.2	-975.8	-1,256.5	-1,559.2	-1,913.9	-2,367.3	-2,423.9	-2,533.8	-2,993.4	-3,194.5
Sic 3900 - Other manufacturing industries	-647.9	-594.4	-597.4	-609.5	-750.9	-855.3	-772.4	-962.4	-1,245.4	-1,476.5
Total	-4,314.8	-3,562.1	-3,449.1	-4,673.7	-7,027.2	-6,002.0	-6,860.4	-11,702.7	-12,512.8	-15,358.0

Source: Statistics Canada

TABLE D-6

MERCHANDISE EXPORTS TO THE EUROPEAN UNION BY COUNTRY, 1990-1999 (MILLIONS OF DOLLARS)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
United Kingdom	3,540.1	3,038.5	3,134.0	2,974.8	3,333.9	3,882.9	4,039.9	3,868.6	4,414.0	4,793.6
Germany	2,322.7	2,431.8	2,318.6	2,568.3	2,331.9	3,317.2	3,338.0	2,734.6	2,714.5	2,413.5
France	1,304.3	1,424.4	1,453.4	1,316.2	1,392.3	1,976.6	1,751.6	1,669.2	1,684.5	1,886.0
Belgium	1,249.4	1,101.4	1,105.8	1,038.4	1,366.9	1,875.2	1,538.6	1,507.9	1,479.2	1,878.5
Netherlands	1,649.2	1,725.4	1,516.8	1,382.5	1,265.9	1,688.1	1,667.6	1,700.8	1,868.4	1,555.8
Italy	1,188.4	1,074.3	1,177.5	968.9	1,323.6	1,839.8	1,372.4	1,540.3	1,532.1	1,444.0
Spain	387.9	509.0	462.8	384.8	391.0	630.3	523.7	596.5	578.9	630.0
Ireland	139.2	136.4	93.6	97.2	179.6	193.4	231.4	344.8	444.2	409.8
Sweden	327.5	234.1	220.4	191.9	249.3	343.8	280.2	399.5	367.3	392.6
Denmark	138.4	129.3	158.5	122.8	110.9	147.2	122.8	182.1	171.6	269.4
Finland	146.7	88.2	100.9	95.7	141.3	221.5	207.1	251.8	231.2	250.0
Austria	158.4	115.7	209.0	144.3	273.0	296.5	424.1	300.1	266.2	208.6
Greece	98.0	70.3	75.2	103.1	84.3	122.8	120.5	121.7	153.9	198.4
Portugal	180.2	153.7	172.1	111.1	100.5	98.9	101.2	106.9	128.2	113.6
Luxembourg	3.7	5.5	9.9	7.2	7.2	10.2	19.1	101.0	137.1	81.5
EU-15	12,834.1	12,238.0	12,208.6	11,507.3	12,551.7	16,644.3	15,738.3	15,425.7	16,171.3	16,525.4

Source: Industry Canada's Trade Data On-line

TABLE D-7

MERCHANDISE IMPORTS FROM THE EUROPEAN UNION BY COUNTRY, 1990-1999 (MILLIONS OF DOLLARS)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
United Kingdom	4,898.3	4,158.3	4,095.0	4,472.5	5,032.7	5,476.1	5,908.1	6,501.5	6,314.0	8,111.6
Germany	3,835.0	3,740.7	3,532.3	3,521.9	4,384.4	4,798.7	4,824.0	5,412.1	6,120.5	6,946.7
France	2,448.7	2,672.4	2,689.2	2,275.4	2,513.0	3,124.1	3,402.4	5,137.3	4,875.3	5,311.2
Belgium	539.2	427.4	428.5	501.1	606.3	727.6	818.5	845.7	958.2	931.9
Netherlands	719.6	598.5	599.1	666.2	857.9	998.6	926.9	1,058.6	1,164.4	1,223.9
Italy	1,954.3	1,793.8	1,747.7	1,935.6	2,587.8	3,270.7	2,718.6	3,069.5	3,436.6	3,597.0
Spain	496.2	461.1	436.5	504.0	636.6	706.1	687.4	786.4	834.3	854.6
Ireland	257.7	352.9	393.6	431.8	466.3	565.2	590.8	786.4	989.3	1,137.7
Sweden	893.1	779.4	791.7	857.9	1,128.4	1,303.2	1,201.3	1,315.8	1,368.1	1,488.4
Denmark	249.0	240.2	244.0	232.9	317.1	335.0	354.6	401.1	572.3	616.9
Finland	360.2	219.7	237.4	254.8	320.3	455.1	417.0	648.5	624.1	593.1
Austria	406.1	280.4	302.6	351.7	455.9	536.4	607.3	624.8	641.2	646.9
Greece	71.1	68.8	64.9	58.7	82.9	66.9	68.0	84.5	80.2	96.8
Portugal	171.8	170.8	185.6	179.0	179.7	215.2	176.4	211.9	206.3	200.5
Luxembourg	27.0	20.4	20.4	29.2	33.8	37.9	36.2	46.9	72.0	62.9
EU-15	17,327.4	15,984.9	15,768.6	16,272.8	19,603.0	22,616.7	22,737.5	26,931.0	28,256.5	31,820.1

Source: Industry Canada's Trade Data On-line

TABLE D-8

MERCHANDISE TRADE BALANCE WITH THE EUROPEAN UNION BY COUNTRY, 1990-1999 (MILLIONS OF DOLLARS)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
United Kingdom	-1,358.2	-1,119.8	-961.1	-1,497.7	-1,698.8	-1,593.2	-1,868.2	-2,632.9	-1,900.0	-3,318.0
Germany	-1,512.3	-1,308.9	-1,213.7	-953.6	-2,052.5	-1,481.5	-1,486.0	-2,677.5	-3,405.9	-4,533.2
France	-1,144.3	-1,248.0	-1,235.8	-959.2	-1,120.7	-1,147.5	-1,650.9	-3,468.1	-3,190.8	-3,425.2
Belgium	710.2	674.0	677.4	537.3	760.6	1,147.6	720.1	662.2	521.0	946.7
Netherlands	929.5	1,126.9	917.7	716.3	408.0	689.5	740.7	642.2	704.1	331.9
Italy	-765.9	-719.5	-570.2	-966.7	-1,264.2	-1,430.9	-1,346.2	-1,529.2	-1,904.4	-2,153.0
Spain	-108.3	47.8	26.3	-119.1	-245.6	-75.8	-163.7	-189.9	-255.4	-224.5
Ireland	-118.5	-216.5	-300.0	-334.6	-286.8	-371.8	-359.4	-441.6	-545.0	-727.9
Sweden	-565.6	-545.3	-571.3	-666.0	-879.1	-959.4	-921.1	-916.3	-1,000.7	-1,095.8
Denmark	-110.5	-110.9	-85.5	-110.1	-206.2	-187.8	-231.8	-219.0	-400.7	-347.5
Finland	-213.5	-131.5	-136.5	-159.1	-178.9	-233.6	-209.8	-396.8	-393.0	-343.1
Austria	-247.7	-164.8	-93.6	-207.4	-182.8	-239.8	-183.2	-324.7	-375.0	-438.3
Greece	26.9	1.5	10.3	44.4	1.4	55.9	52.6	37.2	73.8	101.7
Portugal	8.4	-17.0	-13.6	-67.9	-79.2	-116.3	-75.2	-105.0	-78.1	-86.9
Luxembourg	-23.3	-14.9	-10.5	-22.0	-26.6	-27.6	-17.1	54.1	65.1	18.5
EU-15	-4,493.3	-3,746.8	-3,560.0	-4,765.5	-7,051.4	-5,972.3	-6,999.2	-11,505.3	-12,085.2	-15,294.7

Source: Industry Canada's Trade Data On-line

TABLE D-9

TARIFFS ON CANADIAN EXPORTS TO THE EUROPEAN UNION (PER CENT)

EU Trade-weighted Tariffs

	Agriculture and Agri-food Products	Other Primary Products and Non-food Manufacturing	Total Exports of Goods
1988	7.80	3.47	3.96
1989	9.83	3.33	3.96
1990	12.09	3.34	4.20
1991	14.06	3.44	4.41
1992	15.77	3.45	4.70
1993	17.24	3.60	5.17
1994	19.08	3.34	5.53
1995	20.98	3.45	5.67
1996	22.46	3.42	5.50
1997	19.50	3.36	5.23
1998	17.95	2.99	4.69
1999	15.46	3.02	4.28

Source: Authors' calculations based on IBD CD ROM trade weighted tariffs

TABLE D-10

CANADIAN TARIFFS ON IMPORTS FROM THE EUROPEAN UNION (PER CENT)

Canadian Trade-weighted Tariffs

	Agriculture and Agri-food Products	Other Primary Products and Non-food Manufacturing	Total Exports of Goods
1988	14.46	4.64	5.25
1989	15.18	4.85	5.59
1990	13.14	4.80	5.41
1991	13.03	4.58	5.23
1992	12.81	4.58	5.26
1993	13.39	4.50	5.25
1994	13.46	4.36	5.07
1995	10.33	3.20	3.70
1996	9.55	2.56	3.07
1997	9.38	2.05	2.54
1998	9.17	1.82	2.35
1999	8.69	1.55	2.04

Source: Authors' calculations based on Statistics Canada trade data.

TABLE D-11

CANADIAN-EUROPEAN UNION TARIFF BARRIERS COMPARISON, 1999 (PER CENT)

HS Sector	EU Tariffs on Canadian Exports	Canadian Tariffs on EU Exports
Live animals; animal products	19.91	0.52
Vegetable products	14.83	0.83
Animal/veg fats, oils, waxes and cleavage products; prepared edible fat	10.04	0.61
Prepared foodstuffs; beverages, spirits and vinegar; tobacco, etc.	12.43	12.54
Mineral products	0.47	0.02
Products of the chemical or allied industries	3.7	1.33
Plastics and articles thereof; rubber and articles thereof	6.22	4.42
Raw hides and skins, leather, furskins; saddlery and harness; travel goods, etc.	3.48	3.06
Wood and articles of wood; wood charcoal; cork; mfd of straw, etc.; basketware	1.52	1.29
Pulp of a wood/fib cellulosic mat; waste, paper and paperboard, etc.	2.70	0.48
Textiles and textile articles	10.51	12.04
Footwear, headgear, umbrellas, etc., prepared feathers; artificial flowers; human hair	9.37	12.63
Art of stone, plaster, cement, asbestos, mica; ceramic prod; glass and glassware	5.26	4.1
Nat/cult pearls, prec/semi-prec stones and metals; imitation jewellery; coin	0.20	1.88
Base metals and articles of base metal	3.3	2.5
Machinery/mechanical appliances; electrical equip; sound and television recorders/reproducers;	2.24	0.43
Vehicles, aircraft, vessels and associated transport equipment	6.59	1.24
Opt, photo, cinema, measuring, checking, precision, med/surgical instruments; clocks and watches	2.52	0.36
Arms and ammunition; parts and accessories thereof	2.77	1.38
Miscellaneous manufactured articles	3.05	4.28
Works of art, collectors' pieces and antiques	0	0.09
Trade-weighted average for 1999	4.28	2.04

Sources: EU tariffs: authors' calculation based on IDB CD ROM trade-weighted tariffs;
Canadian tariffs: Statistics Canada trade data, authors' calculations.

TABLE D-12

DISTRIBUTION OF CANADIAN TRADE WITH THE EUROPEAN UNION BY PROVINCE (PER CENT)

Total Merchandise Exports from Canada to EU

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Quebec	28.3	31.9	29.7	34.2	31.6	28.8	31.8	30.6	31.8	32.5
Ontario	31.8	29.2	31.4	32.1	27.9	28.9	31.6	31.3	32.5	31.6
British Columbia	20.7	18.4	16.8	13.8	15.9	17.6	12.7	13.6	12.6	11.7
Alberta	2.5	3.3	3.7	4.3	6.3	6.4	6.3	6.4	6.3	5.7
Saskatchewan	1.7	1.5	2.2	3.0	4.9	5.4	3.7	4.5	3.7	3.5
Newfoundland	2.8	3.9	3.2	2.9	3.2	2.8	3.1	3.3	3.2	3.4
Nova Scotia	3.2	3.1	3.6	2.7	2.8	3.0	3.2	2.6	3.0	2.6
New Brunswick	4.8	5.1	5.1	3.2	3.3	3.3	3.3	2.5	2.5	2.1
Manitoba	2.0	1.8	2.1	2.5	2.8	2.4	2.3	2.6	2.6	1.8
Prince Edward Island	0.2	0.3	0.2	0.1	0.2	0.3	0.2	0.1	0.2	0.2
Territories	1.9	1.5	1.9	1.3	1.1	1.2	1.9	2.5	1.6	4.9

Total Imports in Canada from EU

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Quebec	38.8	37.6	36.4	36.7	36.1	37.1	37.7	34.6	34.2	39.1
Ontario	38.0	37.7	39.5	43.2	43.5	41.9	42.8	41.9	43.4	41.6
British Columbia	5.6	6.8	6.9	5.0	5.8	4.9	5.1	5.0	5.0	4.4
Alberta	2.1	2.3	2.1	2.6	2.9	2.6	2.7	3.1	3.2	3.3
Saskatchewan	0.5	0.9	0.8	0.9	0.9	0.8	1.0	0.7	0.6	0.5
Newfoundland	2.5	1.3	0.6	1.3	0.6	2.8	0.8	1.0	0.6	0.9
Nova Scotia	9.6	8.5	8.6	7.9	8.3	7.4	7.3	7.9	8.4	8.1
New Brunswick	1.1	0.5	0.5	0.4	0.6	0.7	0.8	1.0	0.8	0.6
Manitoba	1.7	4.5	4.7	2.1	1.3	1.6	1.9	4.9	3.8	1.4
Prince Edward Island	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0
Territories	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Industry Canada's Trade Data On-line

TABLE D-13
CANADIAN DIRECT INVESTMENT ABROAD, BY COUNTRY, IN MILLIONS OF DOLLARS

	UK	Ireland	Nthl.	Germ.	France	Belg./ Lux.	Spain	Italy	Den.	GrPo/ Fin.*	Aust.*	Swe.*	Tot. EU*	Oth. Eur.*	US	World
1988	8,812	1,181	870	632	1,460	340	414	178	22	194	35	-6	14,103	1,043	51,025	79,763
1989	11,085	1,117	1,024	870	1,770	408	570	226	47	215	28	27	17,332	1,454	56,578	89,851
1990	13,527	1,269	1,481	898	1,745	550	522	382	45	206	8	29	20,625	1,633	60,049	98,402
1991	15,262	1,500	1,643	957	1,719	1,113	421	868	33	251	20	18	23,767	1,558	63,379	109,068
1992	12,271	1,899	1,827	1,020	1,900	1,236	280	610	35	264	40	14	21,342	1,742	64,502	111,691
1993	12,907	2,558	1,901	1,774	1,801	1,955	342	785	27	335	107	33	24,385	2,029	67,677	122,427
1994	15,038	4,679	2,132	2,354	1,753	3,177	251	985	48	241	145	35	30,658	2,807	77,987	146,315
1995	16,412	5,925	2,255	2,624	2,516	3,043	211	805	55	422	177	73	34,518	3,062	84,562	161,237
1996	17,825	6,872	1,902	2,446	3,543	2,583	161	768	38	457	201	222	37,018	3,072	93,886	180,616
1997	21,828	7,710	1,966	3,382	3,858	2,725	270	671	30	493	225	828	43,986	3,512	105,683	209,678
1998	22,783	8,180	6,655	4,228	4,020	2,611	265	723	40	482	548	819	51,354	3,862	124,405	246,313
1999	22,885	6,774	6,555	4,084	3,777	2,036	317	716	39	435	508	792	48,918	4,076	134,281	257,408
1988-99*	159.7	473.6	653.4	546.2	158.7	198.8	-23.4	302.2	77.3				246.9	290.8	163.2	222.7

EU: United Kingdom, Ireland, Netherlands, Germany, France, Belgium, Luxembourg, Spain, Italy, Denmark, Greece and Portugal, plus Finland, Austria and Sweden after 1995. Finland, Austria and Sweden are included in Other Europe over 1988-1994 and in the EU from 1995 onwards.

* Net percentage increase or decrease over the period.

Source: Industry Canada and Statistics Canada Cat No. 67-202.

TABLE D-14

FOREIGN DIRECT INVESTMENT IN CANADA, BY COUNTRY (MILLIONS OF DOLLARS)

	UK	Ireland	Nthl.	Germ.	France	Belg./ Lux.	Spain	Italy	Den.	GrPo/ Fin.*	Aust.*	Swe.*	Tot. EU*	Oth. Eur.*	US	World
1988	15,696	67	3,103	3,497	2,213	430	37	343	33	24	77	431	25,443	3,225	76,049	114,175
1989	15,556	57	3,988	3,848	3,521	531	31	276	62	28	87	564	27,898	3,900	80,427	122,664
1990	17,185	81	4,276	5,074	3,836	671	39	321	17	24	246	634	31,524	4,020	84,089	130,932
1991	16,224	190	4,043	5,302	4,167	698	52	347	76	33	251	1,098	31,132	4,375	86,396	135,234
1992	16,799	73	4,505	5,012	4,151	786	35	388	77	29	278	1,091	31,855	4,061	88,161	137,918
1993	15,872	11	4,816	5,066	4,365	916	37	401	80	40	309	982	31,604	4,075	90,600	141,493
1994	14,693	79	5,384	4,713	5,326	767	65	277	177	36	287	1,041	31,517	4,762	102,629	154,594
1995	14,097	53	6,276	5,013	5,710	2,664	62	290	184	394	275	857	35,875	4,640	112,948	168,167
1996	14,233	150	7,258	5,236	5,847	3,007	87	308	246	466	269	1,037	38,144	5,479	120,526	180,418
1997	15,375	370	8,260	4,865	5,936	2,618	101	841	268	356	168	1,771	40,929	5,942	132,950	197,884
1998	15,205	648	11,267	5,094	6,260	2,851	87	670	307	630	171	2,045	45,235	6,237	150,194	219,220
1999	14,229	556	10,430	5,809	6,431	3,418	588	713	349	491	169	1,977	45,160	5,094	173,340	239,972
1988-99*	-9.3	729.9	236.1	66.1	190.6	694.9	1,489	107.9	957.6				77.5	58	127.9	110.2

EU: United Kingdom, Ireland, Netherlands, Germany, France, Belgium, Luxembourg, Spain, Italy, Denmark, Greece and Portugal, plus Finland, Austria and Sweden after 1995. Finland, Austria and Sweden are included in Other Europe over 1988-1994 and in the EU from 1995 onwards.

* Net percentage increase or decrease over the period.

Source: Industry Canada and Statistics Canada Cat No. 67-202.

TABLE D-15

CANADA'S NET FOREIGN INVESTMENT POSITION, BY COUNTRY, IN MILLIONS OF DOLLARS

	UK	Ireland	Nthl.	Germ.	France	Belg. Lux.	Spain	Italy	Den.	GrPo/ Fin.*	Aust.*	Swe.*	Tot. EU*	Oth. Eur.*	US	World
1988	-6,884	1,114	-2,233	-2,865	-753	-90	377	-165	-11	170	-42	-437	-11,340	-2,182	-25,024	-34,412
1989	-4,471	1,060	-2,964	-2,978	-1,751	-123	539	-50	-15	187	-59	-537	-10,566	-2,446	-23,849	-32,813
1990	-3,685	1,188	-2,795	-4,176	-2,091	-121	483	61	28	182	-238	-605	-10,899	-2,387	-24,040	-32,530
1991	-962	1,310	-2,400	-4,345	-2,448	415	369	521	-43	218	-231	-1,080	-7,365	-2,817	-23,017	-26,166
1992	-4,528	1,826	-2,678	-3,992	-2,251	450	245	222	-42	235	-238	-1,077	-10,513	-2,319	-23,659	-26,227
1993	-2,965	2,547	-2,915	-3,292	-2,564	1,039	305	384	-53	295	-202	-949	-7,219	-2,046	-22,923	-19,066
1994	345	4,600	-3,252	-2,359	-3,573	2,410	186	708	-129	205	-142	-1,006	-859	-1,955	-24,642	-8,279
1995	2,315	5,872	-4,021	-2,389	-3,194	379	149	515	-129	28	-98	-784	-1,357	-1,578	-28,386	-6,930
1996	3,592	6,722	-5,356	-2,790	-2,304	-424	74	460	-208	-9	-68	-815	-1,126	-2,407	-26,640	198
1997	6,453	7,340	-6,294	-1,483	-2,078	107	169	-170	-238	137	57	-943	3,057	-2,430	-27,267	11,794
1998	7,578	7,532	-4,612	-866	-2,240	-240	178	53	-267	-148	377	-1,226	6,119	-2,375	-25,789	27,093
1999	8,656	6,218	-3,875	-1,725	-2,654	-1,382	-271	3	-310	-56	339	-1,185	3,758	-1,018	-39,059	17,436

EU: United Kingdom, Ireland, Netherlands, Germany, France, Belgium, Luxembourg, Spain, Italy, Denmark, Greece and Portugal, plus Finland, Austria and Sweden after 1995. Finland, Austria and Sweden are included in Other Europe over 1988-1994 and in the EU from 1995 onwards.
Source: Industry Canada and Statistics Canada Cat No. 67-202.